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THIRTEENTH ANNUAL REPORT

OF THE

STATE BOARD OF AGRICULTURE

OF THE

STATE OF MISSOURI

FOR THE YEAR 1878.

BY J P. McAFEE, SECRETARY OF THE BOARD.

JEFFERSON CITY:
CARTER AND REGAN, STATE PRINTERS AND BINDERS.
1879.

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MEMBERS OF THE STATE BOARD OF AGRICULTURE FOR 1878.

JOHN S. PHELPS, Governor of Missouri (*ex-officio*)	Jefferson City, Cole county.
R. D. SHANNON, Supt. of Public Schools (*ex-officio*)	Jefferson City, Cole county.
Dr. S. S. LAWS, Pres't. Missouri University (*ex officio*)	Columbia, Boone county.
G. C. SWALLOW, Dean Agricultural College (*ex-officio*)	Columbia, Boone county.
E. C. MOORE, President	Columbia, Boone county.
HENRY T. MUDD	Kirkwood, St. Louis county.
L. D. MORSE	St. Louis county.
FREDERICK MUENCH	Femme Osage, St. Charles county.
Wm. T. ESSEX	Kirkwood, St. Louis county.
G. R. BUCKNER	Naylors Store, St. Charles county.
Gert. GOEBLE	Campbellton, Franklin Co.
GEORGE HUSMANN	Sedalia, Pettis county.
C. A. NEWMAN	Jefferson county.
FRANCIS KELLERMAN	Washington county.

To the General Assembly of the State of Missouri:

In accordance with the act establishing the Missouri State Board of Agriculture, I have the honor herewith to present the Report for the year 1878; also, sundry papers relating to agricultural interests.

J. P. McAfee,
Secretary of the Board.

LAWS CONCERNING THE STATE BOARD OF AGRICULTURE AND COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

G. S. Ch. 159, § 1—1. A Board of Agriculture is hereby instituted and created a body corporate, by the name and style of the "Missouri State Board of Agriculture," and by that name shall have perpetual succession; power to sue and be sued; complain and defend in all courts; to make and use a common seal, and to alter the same at pleasure.

Ibid, § 2—2. The persons named as corporators of the Missouri State Board of Agriculture heretofore existing, and the duly elected officers thereof, are hereby constituted the officers and members of the Board of Agriculture hereby created, until their successors shall be duly elected and qualified.

Ibid, § 3—3. The Missouri State Board of Agriculture shall, at their next annual meeting, in addition to filling the vacancies then occurring, elect two additional members, and the Governor of the State and the Superintendent of Public Schools shall be *ex-officio* members of the Board. Immediately after the State Board of Agriculture has been increased to twelve elected members, as herein provided, said twelve members shall, by themselves and by lot, be divided into three classes of four each, numbered one, two and three. The term of service of class number one shall expire at the annual meeting in 1867; of class number two at the annual meeting in 1868, and of class number three in 1869; and at the annual meeting in 1867, and at each annual meeting thereafter, there shall be elected four members for the term of three years, to fill the vacancies occurring by expiration of term of service, and any vacancies occurring in unexpired terms of service shall be filled by election for the unexpired term. In case of failure by the President or delegates of County Agricultural Societies to fill vacancies at the annual meeting, the Board shall have power to fill the same by election.

Ibid, § 4—4. The officers of said Board shall be a President, Secretary and Treasurer, and such other officers as said Board shall deem necessary, who shall be elected at the annual meeting thereof, and shall serve for one year, and until their successors are duly elected and prepared to enter upon the duties of their respective offices.

IBID, § 5—5. The Missouri State Board of Agriculture, and their successors, shall have the power to adopt such by-laws and make such rules and regulations for the government of said Board and the management of its affairs and business as they may deem best calculated to promote the interests of agriculture, and as shall not be inconsistent with the Constitution and laws of the State of Missouri and of the United States.

IBID, § 6—6. There shall be held in the city of St. Louis, on the first Wednesday of December of each year, an annual meeting of the Board of Agriculture, together with the President of each County Agricultural Society, or other delegates therefrom duly authorized, who shall, for the time being, be *ex-officio* members of the State Board of Agriculture, for the purpose of deliberation and consultation as to the wants, prospects and condition of the Agricultural interests of the State; to receive the reports of the District and County Societies, and to fill by elections all vacancies in the State Board of Agriculture. The President also shall have power to call meetings of the Board whenever he may deem it expedient, and at any meeting of said Board seven members thereof shall constitute a quorum for the transaction of business.

IBID, § 7—7. It shall be the duty of all Agricultural and Horticultural Societies, organized and established in accordance with the laws of this State, to make a full report of their transactions to the Missouri State Board of Agriculture at each annual meeting thereof.

IBID, § 8—8. It shall be the duty of the said Board to make an annual report to the General Assembly of the State, embracing the proceedings of the Board for the past year, and an abstract of the reports and proceedings of the several agricultural and horticultural societies, as well as a general view of the condition of agriculture and horticulture throughout the State, accompanied by such recommendations, including especially such a system of public instruction upon those subjects as may be deemed interesting and useful.

IBID, § 9—9. The sum of one hundred dollars is hereby appropriated out of any moneys not otherwise appropriated for the uses of the Board, and an account of the expenditures of the Board shall be included in the annual report to the General Assembly.

IBID, § 10—10. The Public Printer shall, annually, under the direction of the President of the State Board of Agriculture and the President of the State Horticultural Society, print and bind, in one volume, six thousand copies of the Annual Report of the said Board of Agriculture and the proceedings of the State Horticultural Society; thirty-eight hundred copies to be for the use of the General Assembly, two hundred for the State Library, one thousand copies for the State Board of Agriculture, and one thousand copies for the State Horticultural Society, for distribution to the agricultural, horticultural and mechanical associations throughout the State.

AGRICULTURE—State Board of—Publication of Report.

AN ACT to amend section ten (10) of chapter fifty-nine of the General Statutes of Missouri, the same being section ten (10), of article one (1) of chapter four (4) of Wagner's Missouri Statutes, third edition, concerning "State Board of Agriculture."

Be it enacted by the General Assembly of the State of Missouri, as follows:

Section 1. Section ten of chapter fifty-nine of the General Statutes of Missouri is hereby amended so as to read as follows:

Section 10. The Public Printer shall, annually, under the direction of the President of the State Board of Agriculture, print fourteen thousand copies, of which two thousand shall be in the German language, of the Annual Report of the said Board of Agriculture; five hundred copies to be bound in cloth, balance in paper covers, to be distributed as follows: Twenty copies to each member of the General Assembly; fifty bound copies to the State Library; thirty copies to each county clerk for distribution among the farmers, as generally as may be, and the remainder to the State Board of Agriculture, to be distributed among the several Agricultural and Horticultural Societies and Farmer Clubs of this State and other States, as the Board may direct: *Provided*, That said Annual Report shall not contain more than five hundred pages.

Sec. 2. All acts and parts of acts inconsistent with this act are hereby repealed.

Sec. 3. This act to take effect and be in force from and after its passage.

Approved March 24, 1875.

APPROPRIATIONS: Board of Agriculture.

Be it enacted by the General Assembly of the State of Missouri, as follows:

Section 1. There is hereby appropriated out of any money in the State Treasury, not otherwise appropriated, the sum of four thousand dollars, annually, for the benefit of the State Board of Agriculture, and the sum of one thousand dollars ($1,000) is hereby appropriated for the State Horticultural Society, to be paid to the Treasurer thereof, quarterly.

SEC. 2. The sum mentioned in the first section of this act shall be paid to the President of the State Board of Agriculture, in quarterly installments, upon the warrant of the State Auditor, drawn in favor of the President of said Board upon the State Treasurer for such quarterly installments: *Provided*, That after the payment of the first quarterly installment the State Auditor shall not draw his warrant upon the State Treasurer for the succeeding quarterly installments respectively, until the President of the State Board of Agriculture shall have filed in the office of the State Auditor good and sufficient vouchers, showing the proper expenditures of the preceding installment, in accordance with the objects of said Board.

SEC. 3. This act to take effect and be in force from and after its passage.

Approved March 18, 1871.

COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

ACTS 1867, p. 3—1. Whenever fifty freeholders within this State, shall present a petition to the county court of the county in which they or a majority of them reside, setting forth that they desire to organize and be incorporated for the purpose of promoting improvements in agricultural manufactures and the raising of stock, and the court shall be satisfied that such persons are freeholders of this State, the court shall, by an order, declare the petitioners incorporated for the purposes specified in this section; and thenceforth the petitioners shall be a body politic and corporate by the name and style of the (naming it) County Agricultural and Mechanical Society, and by that name they and their successors shall be known in law; have perpetual succession; sue and be sued; plead and be impleaded; defend and be defended, in all courts and in all actions, pleas and matters whatsoever; and shall have power to purchase, hold and receive any quantity of land not exceeding one hundred acres, with such buildings and improvements as may be placed thereon, and any other property not exceeding in value fifty thousand dollars; and may, by vote, determine that thereafter the members of said Society shall be composed of such persons as shall subscribe at least one share to the capital stock thereof, in shares not exceeding twenty five dollars each; said shares to be personal property and transferable by agreement; but no transfer shall be binding on the Society until reported to and approved by the Board of Directors. The amount of such capital stock shall, from time to time, be fixed by the stockholders or Board of Directors, provided the same shall at no time exceed one hundred thousand dollars ; and may convey, lease, sell and dispose of the property of the Society, or any part thereof, for the benefit of the Society, and may have a common seal, and break and alter the same at pleasure.

G. S. Ch. 60, § 2—2. Within thirty days from the date of the order of the county court, any number of the petitioners, exceeding twenty, may proceed to organize such Society by electing nine Directors, who shall hold their offices one year, and until their successors are elected ; and the Directors, when so elected, shall collectively form a Board for the government of such Society, and in such Board shall be vested all the corporate powers and duties of every Society incorporated as provided in this chapter; and for the purpose of electing the Directors, there shall be held annually a general meeting of the members of the Society. All vacancies in the Board of Directors shall be filled by appointment of the Board. No person, not a member of the Society, shall be a Director.

Ibid, § 3—3. Every Board of Directors shall assemble within twenty days after their election, and choose a President of their number, and some other person as Secretary, Treasurer, Collector, and such other officers, servants and agents as may be necessary ; remove them from office and prescribe their duties ; and all proceedings of the Board shall be public.

Ibid, § 4—4. It shall be the duty of the President to preside at all meetings of the Board and of the Society, and in case of his absence, such other person as the members present shall appoint; and it shall be the duty of the Secretary to keep a record of the proceedings of the Directors and of the Society ; and the Treasurer shall give bond and security, to the acceptance of the Board of Directors, for the benefit of the Society, in such sum as they, or a majority shall determine, conditioned that he will faithfully receive and pay over, on their order, all moneys and other articles, the property of the Society, that may come into his hands as Treasurer, which bond shall be deposited with the Secretary of the Board of Directors; and the said Treasurer shall keep fair and accurate entries of all moneys and other articles by him received as Treasurer, and from whom received, and to whom and for what purpose paid out, and make report of the financial operations of his office, as often as he may be directed by the Board of Directors.

Ibid, § 5—5. The said Board, a majority of whom shall form a quorum, shall have power to make, ordain and adopt a constitution and all necessary by-laws, ordinances, rules and regulations for the government of the Board of Directors and of the Society, and for the promotion of the objects for which it is designed; and the President of the Board shall cause the same to be carried into effect; provided such constitution, by-laws, ordinances, rules and regulations shall not be inconsistent with the Constitution and laws of this State.

Ibid, § 6—6. All moneys paid by members and others, and donations made to the Society, shall be appropriated under the direction of said Board, in conformity to such constitution, by-laws, rules and regulations as may be ordained and established for the government of the Society and for the advancement and encouragement of the objects of the Society.

Ibid, § 7—7. The county court of any county, in which there shall be a Society organized according to this chapter, or any special act of incorporation, shall have the power, and may, if it shall be deemed expedient, appropriate out of the county treasury for the benefit of the Society, the sum of one hundred and fifty dollars in any one year; and the money so appropriated shall be drawn by the Treasurer of the Society in a proper warrant; *Provided*, Said money shall be annually awarded by the Board of Directors in premiums, or expended by them in the purchase of premiums, to be known as "The (name the county) County Court premiums," to be awarded according to the rules, regulations and by-laws of the Society; *and provided further*, That not more than one such premium shall be awarded to the same animal or article on exhibition by the same county society.

Ibid, § 8—8. At each annual meeting of the Society, the Board of Directors shall report, in writing, the number of members and the financial condition of the Society; the quantity and character of the property owned by it, and the quality and cost of improvement of the same; the number and value of premiums awarded at their annual fair; the number and character of animals and articles exhibited; a statement of the probable quantity of the staple commodities of the county, and prices current thereof, and such other information in relation to the agricultural and mechanical interests of the county as they may deem worthy of general notice; and a copy of the report so made shall be transmitted to the Board of Directors of the Missouri State Agricultural Society (Missouri State Board of Agriculture,) to be disposed of as provided in the next succeeding section of this chapter.

Ibid, § 9—9. The Board of Directors of the Missouri State Agricultural Society, (Missouri State Board of Agriculture) shall, at each session of the General Assembly of the State of Missouri, report faithfully all the facts, statistics and information contained in the reports transmitted to them from the county agricultural and mechanical societies organized and incorporated under the provisions of this chapter, and such other facts, statistics and information as they may gather from other counties in this State in regard to agricultural, mechanical and domestic manufacturers and productions, and to the raising of the various breeds of stock.

IBID, § 10—10. The land and other property which may be held by any Society under the provisions of this chapter, shall be held by the Society for the sole purpose, and none other whatsoever of erecting inclosures, buildings and other improvements, calculated and designed for meetings of the Society, and for exhibitions of various breeds of horses, cattle, mules and other stock, and of agricultural, mechanical and domestic manufacturers and productions, and for the purchase and importation and the keeping thereof of such foreign breeds of stock as the Board of Directors may deem advantageous to the interests of the county.

IBID, § 11—11. The members of any Society organized under the provisions of this chapter, shall be composed of such persons, and none others, as shall have subscribed their names as such in the books in which the proceedings of the Society and of the Board of Directors are or shall be recorded, and paid annually to the Treasurer of the Society such sum, not exceeding five dollars in any one year, as may be established by the rules, by-laws and regulations of the Society as a membership fee; and such persons shall be members only for the year for which he shall have paid such fee.

IBID, § 12—12. A duly authenticated copy of the order of the county court provided for in section one of this chapter, shall be filed and recorded in such manner as conveyances of land are by law directed to be recorded in the office of the recorder of the county, within three months after such order shall be made.

IBID, § 13—13. The constitution, by-laws, rules and regulations of the Society and Board of Directors, shall be printed and circulated among the members of the Society, within thirty days after their adoption.

IBID, § 14—14. Whenever a majority of two-thirds of the members of any Society organized under the provisions of this chapter, shall, at an annual meeting, declare such Society dissolved; or if, from any other cause, said Society shall be dissolved or fail to meet and pursue the objects of the Society for the period of five consecutive years, then the real estate and all other property held by it shall be sold for cash in hand at public auction, before the court house door of the county, after thirty days' notice given in some newspaper published in the county, if there be one, and if not, by ten printed advertisements set up in ten public places in the county, describing the property to be sold, and the time, place and terms of sale. Such sale shall be conducted by the Directors, or a majority of them, chosen and elected as provided by this chapter.

Ibid, § 15—15. At any fair, show or exhibition, held by an incorporated Agricultural and Mechanical Society, every person who shall, without the permission of the officers of such Society, enter within any inclosure which may be used by such Society as an agricultural and mechanical fair, and every person guilty of disorderly conduct, or such conduct as may interrupt or be prejudicial to the interests of such fair or exhibition whatever, within the inclosure for same, or at a distance within two hundred yards of such inclosure, shall be liable to immediate arrest by any officer of such Society, and to the payment of five dollars to the Society holding such fair, show or exhibition, to be recoverable at the suit of such Society, before any justice of the peace of the county in which such fair, show or exhibition may be held.

Ibid, § 16—16. All agricultural societies in this State, established under the act above cited, and that have failed to keep up their organization, as required by the law approved November 23, 1855, are hereby authorized and empowered to pursue the objects of such societies, and perpetuate their organizations as though no failure to observe the law had occurred.

AGRICULTURE: Missouri State Board.

Be it enacted by the General Assembly of the State of Missouri, as follows:

Section 1. That sections two, three, four and six of chapter fifty-nine of the General Statutes of Missouri, entitled "Of the State Board of Agriculture," be, and the same are hereby amended, so as to read as follows: Section 2. The persons named as corporators of the Missouri State Board of Agriculture heretofore existing, are hereby constituted members of the Missouri State Board of Agriculture, under this act, and there shall be a meeting of said Board of Agriculture as constituted by this act, held at the Agricultural College Building of the State University, on the second Wednesday of July, 1877, to elect a president, secretary and treasurer, and such other officers and agents as the Board shall deem necessary. And no officer, so appointed or elected by the said Board, shall receive any salary for his services, except the treasurer and secretary; and the salary of the treasurer shall not exceed forty dollars per annum, nor shall the secretary receive more than six hundred dollars per annum; and all the offices of the present Board of Agriculture are hereby declared to be vacant, from and after the time when this act takes effect.

SEC. 3. The Governor, the State Superintendent of Public Schools, the President of the State University, and the Dean of the Agricultural College, shall be, ex-officio members of the State Board of Agriculture, and the Governor shall appoint practical farmers to fill all vacancies as they occur in the corporate members of said Board of Agriculture.

SEC. 4. The officers of said Board of Agriculture shall be elected at the annual meeting of said Board (except those elected as provided for in section two of this act), who shall serve for one year and until their successors are elected and qualified; and the offices of the secretary and treasurer shall be in the Agricultural College building aforesaid. On the first Wednesday of November in each year, an annual meeting of the State Board of Agriculture, together with the president of each county agricultural society or delegate therefrom, duly authorized, who shall, for the time being be ex-officio members of the State Board of Agriculture, for deliberation and consultation as to the wants, prospects and condition of the agricultural interests of the State, to receive the reports of district and county societies, and to fill by elections all vacancies in the Board. The president shall have power to call meetings of the Board when he may deem it expedient, and at any meeting of said Board, seven members shall constitute a quorum; and all meetings of the Board shall be held at the place of holding the regular meetings of the Board, in November of each year.

SEC. 7. [2.] Upon the passage of this act it shall be the duty of the present Board to turn over all papers, records, furniture and other property to the board hereby created by this act.

Approved April 26, 1877.

PROCEEDINGS

OF THE

MISSOURI STATE BOARD OF AGRICULTURE.

COLUMBIA, MO., Nov. 6, 1878.

The Missouri State Board of Agriculture, met in the rooms of the Agriculture College, Columbia, Mo., at 2 o'clock P. M., this being the time fixed by law, for the annual meeting of said Board, and was called to order by the president, E. C. Moore.

On motion of Dr. Laws, a committee on credentials was appointed, consisting of Maj. J. S. Rollins, Prof. G. C. Swallow and Wm. Smith of Huntsville.

After examination of credentials, the committee reported the following, which was accepted and adopted:

MR. PRESIDENT: The committee appointed to ascertain the present status of the State Board of Agriculture, and to designate the names of the members of the regular Board, under the laws as they now exist, beg leave, respectfully to report, that under the law passed and approved, the 26th day of April, 1877, the committee have arrived at the conclusion, that the following persons at present compose the Missouri State Board of Agriculture, to-wit:

Henry T. Mudd, Kirkwood, St. Louis Co., Mo.

L. D. Morse, St. Louis Co.

Frederick Muench, Femme Osage, St. Charles Co.

Wm. T. Essex, Kirkwood, St. Louis Co.

George R. Buckner, Naylor's Store, St. Charles Co.

Gert. Goeble, Campbellton, Franklin Co.

E. C. Moore, Columbia, Mo., President, by appointment of Gov. Phelps.

George Husmann, Sedalia, Mo.

C. A. Newcomb, Jefferson Co.

Francis Kellerman, Cadet, Washington Co.

Together with the four following *ex officio* members:

President Missouri State University.

Dean Agricultural College.

Governor of the State, and

Superintendent of Public Schools.

And the presidents of all county agricultural and mechanical societies, and delegates appointed by them, to meet at the annual meeting of said Board, and who are made by law, for the time being, *ex officio* members of said Board.

The same committee was also made a committee on order of business, and submitted the following as their report, viz:

That there being no meeting held at the time mentioned in the law of April 26, 1877, and this being the first, and the regular annual meeting provided for by law, the committee recommend, that in order to have the Board fully organized under the new law, that they proceed to elect a president, secretary and treasurer, being the officers provided for in the law, and that the Board take steps to collect all property, furniture, books, etc., belonging to the State Board of Agriculture, wherever the same be, for the use of this Board.

That the various county and local agricultural societies in the State be requested to report to this Board, as early as practicable, the condition of their respective organizations, together with all information in their possession, bearing upon the subjects of horticulture and agriculture in their respective localities; and,

That this Board cause to be laid before the next General Assembly of the State, such facts and information touching the best interest of agriculture and horticulture, and the various mechanical industries, and the present condition and prospects of the agricultural and mechanical department of the State University, as to them may seem best, and such other matter as may devolve upon them under the law.

J. S. ROLLINS, *Chairman.*

The report was accepted and adopted.

On motion, the Board proceeded to the election of officers, which resulted as follows, viz:

E. C. Moore, President.

G. C. Swallow, Vice President.

J. P. McAfee, Secretary.

S. M. Tracy, Treasurer.

On motion, the President of the Board, Maj. Rollins and Wm. Smith, were appointed a committee on by-laws.

On motion, the President of the Board was authorized, either in person or by proxy, to make a call upon the former State Board of Agriculture for all books, papers, desks and other property in its possession and belonging to the State Board of Agriculture.

The Board then adjourned till 10 o'clock A. M., to-morrow.

THURSDAY—MORNING SESSION.

At 10 o'clock, A. M., the Board was called to order by the President.

The Committee on By-Laws made the following report:

BY-LAWS.

SECTION 1. The officers of the Missouri State Board of Agriculture shall consist of a President, Vice President, Treasurer and Secretary.

SEC. 2. It shall be the duty of the President to preside at the meetings of the Board, to sign all warrants on the Treasurer ordered by the Board, and to perform such other duties as are or may be required by law. He shall be ex-officio Chairman of the Executive Committee. In his absence the Vice President shall perform his duties.

SEC. 3. It shall be the duty of the Secretary to keep and preserve the minutes and records of the Board, and the proceedings of the Executive Committee, to furnish a copy of the same for publication, previous to the expiration of his term of service, and to countersign all warrants on the Treasurer for money.

SEC. 4. The Treasurer shall keep the funds of the Board, and pay all warrants drawn by order of the Board, signed by the President and countersigned by the Secretary, and shall make his report at the annual meeting in November, of his receipts and expenditures, from whence received and to whom paid, properly arranged for publication. He shall give bond in such penal sum as may be required by the Board for the faithful performance of his duties, and the payment of all moneys in his hands.

SEC. 5. It shall be the duty of the Secretary to conduct all correspondence with societies and individuals; to issue such circulars for obtaining statistics or other information as the Board may direct,

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or as may be deemed expedient or useful; to collate and arrange the correspondence, proceedings of the Board, and the proceedings of the county societies for report and publication, as required by law, and distribute to county societies and others entitled to them, all seeds, plants, publications, etc., which may be acquired by the Board for distribution. His term of office shall hereafter commence the first day of March, and continue one year, and until his successor is elected.

SEC. 6. The President, Vice-President and Secretary shall constitute an Executive Committee, whose duty shall be to inspect and audit all accounts, to inspect and pass upon all papers entering into the annual report, and to perform such other duties as may be required of them in the intervals between the meetings of the Board.

SEC. 7. The President shall have authority to call special meetings of the Board, whenever he may deem it necessary or important to do so.

SEC. 8. These by-laws may be altered or amended at any annual meeting of the Board: Provided, That any member proposing to amend the by-laws at said meeting of the Board, shall give two weeks' notice prior to said meeting, to all the corporate members or their successors in office, of such intended motion to amend.

SEC. 9. The records of the proceedings of the Board shall at all times be open to the inspection of the members.

On motion, the report was considered *seriatim*, and adopted.

The Board fixed 4 o'clock P. M., to hear the reading of a paper on "Grapes in 1878," prepared by George Husmann, at the request of the Board.

The Secretary was instructed to present the report from this Board, required by law, to the next General Assembly of the State.

On motion, the Executive Committee was appointed a committee on legislation, in the interval of this Board.

On motion, the following resolution was adopted, viz:

WHEREAS, J. P. McAfee, the Secretary of this Board, was appointed provisional secretary on the 26th of March last; and

WHEREAS, He has been actually engaged since that time in collecting statistics and papers on important agricultural subjects; be it

Resolved, That he be requested to use such statistics and papers in preparing the next annual report, and that we hereby recognize his just and reasonable claim for compensation for his services and reimbursement of money expended in the work attended to, and that the committee on legislation be directed to take this action into consideration.

Prof. Swallow offered the following motion, which was adopted:

Resolved, That E. C. Moore, George Husmann and Wm. Smith be a committee to examine and report upon the condition and wants of the Agricultural College.

On motion, the Board adjourned to meet again at 4 o'clock P. M.

AFTERNOON SESSION.

At 4 o'clock P. M., the Board was again called to order, when, by request, George Husmann read a paper on "Grapes in 1878—Future Prospect of Grape Growers in Missouri."

On motion, a copy of the paper was asked for publication in the next annual report of this Board. [See Report of State Horticultural Society.]

It was moved and adopted that when the Board adjourns, it adjourn to meet on the 10th day of December next, at 2 o'clock P. M.

On motion of Dr. Laws, the Board decided to invite Gen. James L. Minor, of Jefferson City, to deliver an address in the Missouri University, during Commencement, 1879, on the subject of Agriculture.

The Board adjourned until the second Tuesday of December, prox.

J. P. McAFEE, *Secretary.*

AGRICULTURAL COLLEGE ROOMS,
MISSOURI UNIVERSITY, Dec. 10, 1878.

The Board met pursuant to adjournment.

PRESENT—E. C. Moore, President; George Husmann, D. M. Taylor of Pike county, J. C. Evans of Clay county, N. J. Colman of St. Louis and J. P. McAfee.

The committee appointed at the November meeting to examine and report on the condition and wants of the Agricultural College, presented the following report:

To the Hon. State Board of Agriculture of the State of Missouri:

GENTLEMEN: We, the undersigned, having been appointed a committee to inspect the general management and condition of the Agricultural College of the University of Missouri, beg leave to submit the following report to your honorable body:

Your committee visited the Agricultural Farm, including the horticultural, agricultural and other branches; inspected the barn, stable and other out-buildings upon said farm, as well as the stock, consisting of hogs, cattle, sheep, etc.; also saw something of the interior working of the department, namely, within the walls of the agricultural and scientific building, where charts, specimens, models and illustrations are found, as well as a fine laboratory and a well chosen library, all under charge of skilled and competent professors, able and willing to impart the needful instruction. We regard the system here pursued, combining, as it does, the practical with the theoretical imparting of knowledge in the science of agriculture, as one of great importance, and meeting a want which has long been felt throughout the western country. We cordially approve of the system as explained to us by the professors, and we feel confident that good results will flow from this important branch of the State University. We note with pleasure one feature in the system here pursued, which we regard as eminently proper. Labor on the farm is furnished to those students who desire it, at fair wages, thus enabling them to put into daily practice the information acquired, and to pay at least a part of their own expenses, which, with some, is a matter of much importance.

We found affairs in good condition, considering the fact that the officers of the institution have only had control of the agricultural portion of the farm for about two years; considering, also, some serious embarrassments under which they now labor, chief among which is the fact that they had no available means outside of what they earned on the farm.

Among a multitude of things wanted to make this department thoroughly organized and efficient, we mention some of those most imperatively needed:

There is great need of more stable and barn room. The fine stock, including some choice breeds of sheep, hogs and cattle, need shelter during the severe weather of winter. There is also much need for a house and sheds in which to keep the various agricultural tools and implements, as well as machinery and wagons.

Also, in our judgment, a good poultry yard and house is needed for the proper classification and propagation of the different breeds of domestic fowls.

Also, a house for the propagating of seeds, plants, etc.

There is also need of shelves and cases in the Agricultural Hall for the presentation and display of various products and specimens which now encumber the mineral and geological cabinet.

Also, additional apparatus and specimens in the lecture room. Various repairs are needed—some even in the handsome and substantial mansion on the farm.

The stock are in good condition, and, if properly sheltered, may become a source of profit to the institution.

There is, however, not nearly enough stock for the size of the farm.

For making the aforesaid repairs and supplying the needed additional out-buildings, we suggest that a reasonable appropriation be asked from the Legislature of the State, believing that a portion of the public funds could not be better expended than in preserving and improving this portion of the State property, and developing into higher usefulness and perfection a branch of education in which the citizens of the whole State are jointly interested.

All of which is respectfully submitted.

GEO. HUSSMANN,
WM. SMITH,
C. H. WEBER,
E. C. MOORE,
Committee.

COLUMBIA, Nov. 8, 1878.

There being no further business before the Board,

On motion of N. J. Colman, an adjournment was ordered till the 28th of January next, and upon that day the Board meet in Jefferson City.

J. P. McAFEE, *Secretary.*

The Agricultural College.

WHAT IT IS, AND WHAT IT NEEDS—LETTER FROM GEO. HUSMANN TO HON. NORMAN J. COLMAN.

FRIEND COLMAN:—During the recent meeting of the re-organized State Board of Agriculture at Columbia, I had ample opportunity to inform myself about the condition of the Agricultural College, and as we have labored in the cause together for the last fifteen years, and as you well know, also, that I was far from concurring in its establishment at Columbia, and its connection with the State University, I trust that a condensed report of what I saw there will be interesting to you, as well as to the many readers of the *Rural*.

After an interesting meeting of the Board on the 6th and 7th days of November, we were invited to examine the farm and grounds, which we found in a high state of cultivation. Prof. Swallow, the Dean of the College, Prof. Tracy, Superintendent of the Horticultural Department, and Mr. Maddex, Farm Superintendent, evidently know what they are about, and work with their whole souls in the cause. It is but little over a year since the college has had control over the farm, but even this short time shows what science, combined with labor, can do. There are in cultivation now, 40 acres in corn, 55 acres of wheat, 10 acres of oats, 35 acres in meadow, 400 acres in pasture, and about 18 acres in orchard, vineyard, small fruits and kitchen garden. Experiments have been made with 213 varieties of potatoes, 61 varieties of wheat, 20 varieties of oats, 15 varieties of corn, several varieties of sweet potatoes, etc. For the Horticultural Department, interesting experiments are made with strawberries, 11 varieties, 75 varieties of apples, about 30 varieties of grapes, a large number of varieties of pears, plums, cherries, peaches, raspberries, etc., to test their comparative value, and the same is done in the kitchen garden. Also experiments with 6 kinds of hedges, deciduous and evergreen. Four acres of ground are underdrained. A very interesting experiment is also made with sub-soiling, on a piece of ground which has been cultivated mostly in corn for over fifty years, according to Prof. Swallow's theory of the fertility of the marl underlying the soil on the bluffs, and it shows a good yield even in this last extremely dry summer, showing more conclusively the value of deep plowing and subsoiling than any number of theoretical articles can do.

The college has five varieties of improved sheep and two of neat cattle—short-horns and Alderney or Jersey; 60 Berkshire and two Poland China hogs, and eighty head of graded cattle of all ages. A good collection of farming implements and machinery is already on hand, and it is the intention of the Faculty to test all and report annually upon their comparative value; also to distribute to the farmers and horticulturists of the State, the most approved varieties of seeds and plants, as soon as a sufficient quantity can be grown and supplied.

The college has, in the classes in Practical Agriculture, 33 students; but besides these there are about 200 of the University students also attending the classes of Professors Swallow, Tracy and Schweitzer. As to the design governing their studies, I cannot do better than quote the language of the last report:

DESIGN OF THIS INDUSTRIAL COLLEGE.

"It is the design of this school to give an education that will fit the pupil for intellectual and manual labor—to make him a man in body and mind, that he may enjoy the *mens sana in corpore sano*. Our graduates must be the peers of scholars in mental culture, and the equals of laborers in manual skill and physical development, that they may be prepared to honor labor and utilize and dignify learning.

"To do this, one must have a thorough knowledge of his profession, and be able to do his work with skill and care.

"The first and highest employment of man is to cultivate the soil, to feed and clothe the world. To do this well has been the ambition of the great and good of every land. The increase of populations and the multiplied demands for the products of the soil, must render this department of human industry more and more prominent, lucrative, and honorable.

"It is, therefore, eminently appropriate for this college, located in the midst of the best agricultural regions of the continent, in which the populations of the earth are concentrating with unprecedented rapidity, to invite our youths to such a collegiate course of study and labor as will best fit them to develop the agricultural and mechanical resources of the State, and meet the coming demand upon their capacities. For such an education, a man must learn two things:

"1. What to do, and how it should be done. 2. He must acquire the manual skill to do it, and do it well. To know what and how, is the Science. To have the manual skill, is the Art. To get the Science, he must study. To get the Art, he must work.

"Our Industrial College, then, must be a school of labor as well as study. But how much study and how much labor, are questions not definitely settled, but in general terms it may be stated—

"The pupil must study until he knows what should be done, why and how. When this is accomplished, the Intellectual division of an Industrial education is finished.

"The pupil must labor until he can do all farm work with skill; and when this is accomplished, the Manual division of an Industrial Education is finished.

"Whatever is more than this, has no more place in an Industrial School than in any other. It is not the idea of our school to furnish a place for pupils to work, but a place where they may learn to work, as well as to think.

"But what shall the pupils do? Everything that is done on the farm, in the garden, orchard and nursery.

"Who shall direct the labors of the pupils? He who teaches what is to be done, why it should be done and how, is the one to see that it is done, and well done. Then the teaching and practice will agree; science and art go hand in hand. This will prevent the introduction of many useless and impracticable theories. When one teaches, merely, he can advance many beautiful theories for others to practice; but when he is expected to carry out his own suggestions, he will be more cautious, take more care that his instructions will bear the test of actual experiment.

HORTICULTURAL DEPARTMENT.

"As the ladies of Missouri have done so much to create a taste for the culture of fruits and flowers and ornamental grounds, it is but just that the Commonwealth should provide a school where their daughters, as well as sons, may perfect themselves in these delightful pursuits. All necessary fixtures will be provided to make this department of the Industrial College most useful and instructive.

"The ladies are, therefore, invited to partake of the benefits of this Horticultural course, where everything will be so managed as to awaken and cultivate the most refined and exalted tastes, and lead woman back to the pursuits she so much enjoyed in Eden.

"The first class in this department was formed during the year 1874. It consisted of nineteen young ladies and five young gentlemen, besides a large number of agricultural students. Twenty-four completed the course and received diplomas.

AGRICULTURAL LECTURES.

"Lectures are given each day on the practical applications of science to agricultural pursuits.

"The students of this college are by law admitted to the lectures and other exercises of all the departments of the University."

So far, the report which I have quoted show your readers the design for the studies. That it is carried out, and well carried out, as far as the limited means at command will admit, no one can doubt, who has an opportunity to see what has been done so far. Besides the experiments already named, experiments in forestry, testing the different varieties of timber and ornamental trees, and their relative value, in floriculture, in short, in all operations connected with agriculture and horticulture are, intended. The University grounds, already containing a great variety of trees and shrubs, could be made an arboretum, where all varieties of hardy trees and shrubs could be found, properly labeled, and their habits and value as timber and ornamental trees could be learned and seen by the students and visitors from all parts of the State.

The farm needs more improved varieties of animals, better stables, tool-houses, fences, bridges, roads, etc.

The horticultural grounds need green-houses and propagating-houses, and other fixtures for horticultural operations.

The lecture rooms need more apparatus to illustrate the lectures, as they have but very little.

That the farm is well and successfully managed and pays its way, is evident from the report of the Superintendent, showing the amount of expenditures during the year to be $1,273.32; income from farm, $1.441.83; stock and grain on hand, estimated, $2,700.

Students can board at the club houses for about $1.75 per week; in private families for from $2.50 to $3.50 per week, so that it costs but little to study there.

But this institution, calculated to do so much for the benefit of the farmers of this State, is languishing for want of means. The men who are doing this great and good work, with their whole souls devoted to it, and seeing clearly what should be done, are hindered and cramped, and can only perform a little of what they would do were they helped by a donation from our Legislature. I ask the farmers of this State, Shall it remain so? Will you stand idly by and see this, emphatically and exclusively your institution, languish for the want of a few thousand dollars to help it along in its good work to educate our sons and daughters, to scatter its numberless benefits into every nook and corner of the State, however remote? I admit that there was room and just reason for censure in the past, but this has changed now, and the President and Curators of the University do not now slight the College, and appropriate funds which should have been used exclusively for its benefit, for the other departments of the University. President Laws and the present Board believe that the success of the University depends upon the success of the Agricultural College, and it only depends on your action now whether it becomes what it ought to be. Do for once assert the dignity of your calling; demand of your newly-elected legislators to see to your interests, and see that the name of Missouri be no longer a by-word and reproach, that this penny-wise, pound-foolish policy be abandoned, which has been the curse of this noble State but too long. Show to the industrious immigrants from other States and lands, who now pass through your fruitful, low-priced lands to go into droughty Kansas, just because the government of that State is wise and enterprising enough to do something for the advancement of agriculture and horticulture, and although they must pay higher prices for poorer lands, that you are also willing to offer inducements to settlers among you, that you are alive to your true interests. Kansas has a well endowed and flourishing agricultural college. Its State Horticultural Society receives an appropriation of $5,000 per year, while the members of your State Board of Agriculture must pay their traveling expenses out of their own pockets to attend the meetings; and your Horticultural Society does not receive a dollar, and had to have its proceedings printed in this paper, or they would not have been published at all. Is it surprising that Missouri, with all her natural advantages, which entitle her to a front rank, must take the back seat, that no enterprising, intelligent farmer will settle here when the interests of the farming community are systematically slighted and overlooked, and will go into Kansas instead, where they are cherished and fostered. It is time, high time, in this age of general progress, that we also do something, for he who does not advance with the rest will fall irretrievably behind. You have submitted too long to this neglect of your best interests by our representatives. Awake from your apathy, and tell them that they must and shall look to your best interests, and as you are taxed higher than any other class, you will also be represented. So far you have had taxation without representation. See to it that this be changed, and that you will give no man your vote for a public office who is not to serve you as well as the capitalists and nabobs of our cities.

Give the College but the means to accomplish its purpose, and you will soon feel its influence in all pertaining to agriculture and horticulture, in the distribution of better seeds, trees and fruits, and in the increased knowledge and intelligence of our farming community. I have worked among you for the last thirty years; I have been proud of our State and its resources, but more sad and sorrowful of late to see them so grievously neglected. I am going down the shady side of a life devoted to the interests of the farming community, and when it closes, may it be my lot to see the commencement, at least, of a better and more prosperous era for the tillers of the soil. Let us all "pull together," and we can accomplish it.

In conclusion, I wish to express my thanks to all the officers of the College and University for the kindness and attention which enabled me to obtain so full an insight into its operations, and especially to Dr. Laws, Professors Swallow, Tracy and Schweitzer, and Mr. Maddex, the Superintendent of the Farm.

GEORGE HUSMANN.

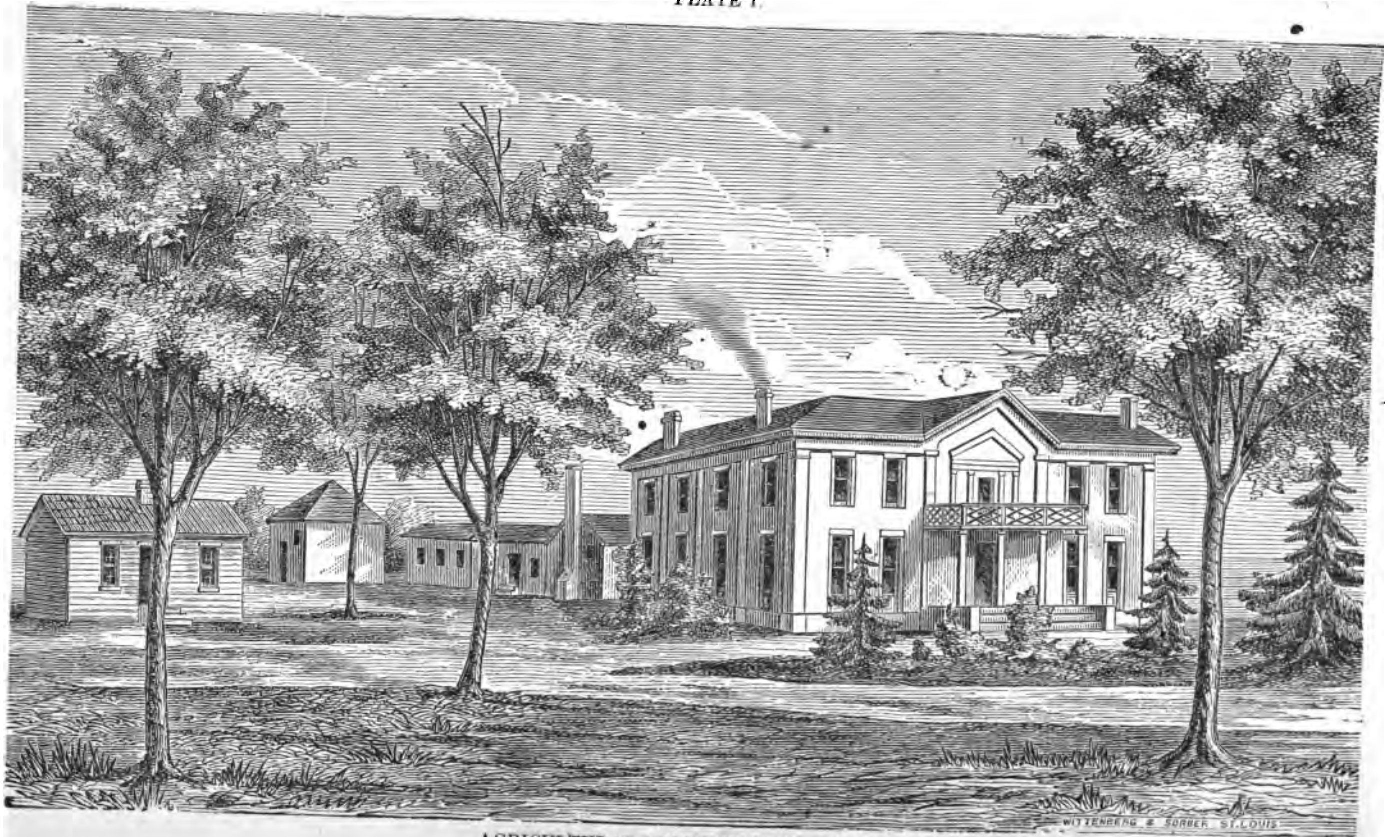
SEDALIA, November 25, 1878.

Report of the Agricultural College.

J. P. McAfee, Secretary of State Board of Agriculture:

In compliance with your request, I herewith present such facts, connected with the work of the Agricultural College Farm, as will give a good idea of what has been done since the publication of the last report of the State Board.

PLATE I.



AGRICULTURAL COLLEGE FARM HOUSE.

PLATE 1.

This house fronts west 52x44, with vestibule 18x10, and back extensions 116. There are twenty rooms, besides 2 cottages, 2 barns with stables, ice-house and other out-buildings. It was built by Wm. A. Hudson, formerly President of the University. It is a large and excellent house, and beautifully located within less than half a mile from the Campus. By appointment of the Board, the DEAN of the Agricultural College now occupies this house, and takes direct charge and control of all the operations on the Farm. Just as the President of the University is required to live in the dwelling on the Campus, and is charged with the care of the property thereon, so the Dean of the Agricultural College is required to live in the main dwelling on the Farm, and to act the practical farmer.

CLASSES TAUGHT BY THE PROFESSORS OF AGRICULTURE IN 1877-8.

1st Semester.

Mineralogy and Palæontology, (by Prof. Swallow,)	14
Zoology, (by Prof. Swallow,)	34
Geography, (by Prof. Swallow,)	18
Freshman Agriculure, (by Prof. Swallow,)	25
Physical Geography, (Prof. Tracy,)	45
Sophomore Agriculture, (Prof. Tracy,)	2

2nd Semester.

Geology and Physical Geography, (Prof. Swallow,)	15
Botany, (Prof. Swallow,)	67
Freshman Agriculture, (Prof. Swallow,)	23
Sophomore Agriculture, (Prof. Swallow,)	2
Entomology, (Prof. Tracy,)	20
Zoology. (Prof. Tracy,)	6

WORK ON THE FARM.

Besides the ordinary operations of the Farm, Garden and Nursery, whose surplus products sold for $1,959.43, extensive repairs, improvements and numerous experiments have been made during the year.

The Farm House, heretofore used as a boarding house, has received extensive repairs, and the out-buildings have been greatly improved. The Farm House is now occupied by Prof. Swallow, who, by the action of the Curators, is placed in immediate charge of all farming and horticultural operations.

Fences—Much new fence has been built, and a large amount of the old repaired.

Hedges—Some new hedges have been put out, and all the old ones put in prime order. All the *Osage Orange* hedges promise well. The *Honey Locust* hedge will evidently sooner make a fence which will be a more perfect protection against man and beast. But the *Arbor Vitæ hedge* gives but little promise of success, in our hot, dry summers and in clayey soils. It will do better in wet, sandy soils.

Orchard. The old orchard has nearly all died out since Prof. Hudson's death. To fill up the orchard, three hundred young trees—Apples, Quinces, Peaches, Plums, Cherries and Apricots, were put out last spring.

A Garden, designed to be a model *Farm Garden*, has been cleared up, fenced and planted with such small fruits—Grapes, Strawberries, Gooseberries, Currants, Blackberries and Raspberries—and all the most useful vegetables in sufficient quantities to supply a large family throughout the year.

EXPERIMENTS IN INDIAN CORN.

A series of experiments has been undertaken on the Agricultural College Farm with Indian corn, to determine with absolute certainty what varieties of corn are most profitable for the various uses for which they are cultivated in Missouri. Thirteen varieties were planted on new sod, May 25, 1877, in equal quantities and on lands of equal fertility, and having the same exposure. They were planted in rows three feet ten inches distant, and in hills two feet apart, with two stalks in a hill. The patches were separated by several rows of broom corn, to prevent mixing.

The season was unfavorable, as the early part was too wet, and the last part too dry for the clay soil of the hickory land on which they were planted. Still, all the varieties were well ripened before any was injured by frost.

Cultivation.—The corn was harrowed once, hoed once and plowed four times.

This experiment will be continued through several years, dropping such varieties as prove inferior, and adding such as promise better results. Some varieties will have the advantage in short, some in dry, others in cold, and others still in hot seasons. The last season was most favorable to the early varieties—Early Canada and King Phillip—as they were nearly matured before the drouth injured them.

Accurate and exhaustive chemical analyses* will be made to determine the comparative amount of materials in each variety for forming *muscle, fat* and *alchohol.*

The following tables will show all the points essential in judging the value of corn, save the hardness, chemical qualities, time of ripening, and the number of ears on the stalk, all of which will be noted in future years:

Table Showing the Weight of Each Variety.

	Name of Variety.	*Weight in Pounds.*
No. 1.	Evans	†431½
2.	Chester county Mammoth	454¾
3.	Early Yellow	445½
4.	Illinois Yellow	467
5.	Pale Yellow	325
6.	Bloody Butcher	306½
7.	Early Canada	386½
8.	Early King Phillip	334½
9.	Proctor Bread	463

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*The analyses not yet made.

†Some horses got into the patch of Evans corn and injured it.

Name of Variety.	*Weight in Pounds.*
10. Baden	498½
11. Thompson	413½
12. St. Charles White	427½
13. Long John	468

The following table shows the color, length and circumference of ears and cobs; the number of rows and kernels in a row; the average length, width and thickness of the kernels, and the weight of the corn and cob in each ear, in ounces and grains.

Two good ears of each variety were selected for these measurements and weights. Four of the ears, two of the Evans, Nos. 14 *a* and 14 *b*, and two of the Proctor Bread, Nos. 15 *a* and 15 *b*, were selected from the ordinary farm crop, (which were planted earlier and in old ground) to show that the ears of the 13 varieties are smaller than they would be under favorable circumstances:

TABLE SHOWING COLOR, LENGTH, ETC., OF EARS AND COBS, NUMBER OF ROWS, AVERAGE LENGTH, WIDTH, THICKNESS, ETC.

Number	Name of Corn.	Color of corn	Color of cob	Color to pith	Length of ear	Circumference of ear	Circumference of cob	How filled out	No. of rows in ear	No. of kernels in row	Length of kern'ls	Width of kernels.	Thickness of kernels	Weight of cob.	Weight of corn on ear
1 a	Evans	R	R	C B	10.5	6.75	3.75	well	14	62	.61	.41	.17	1.130	10.298
1 b	Evans	Yel	C W	C B	9	6.9	3.6	scant	20	54	61	.41	.17	1.389	10.401
2 a	Chester Co. Mammoth	Yel	R	C B	10.75	7	4.5	well	16	54	.55	.42	.20	2 8	10.390
2 b	Chester Co. Mammoth	Yel	R	C B	10.5	5.75	4.2	well	18	51	.56	.50	.20	1.413	10.245
3 a	Early Yellow	Yel	R	W B	8.5	6.75	3.6	scant	16	44	.58	.41	.19	1.111	8.174
3 b	Early Yellow	Yel	R	C B	9.2	6.5	3.6	scant	14	57	.53	.40	.16	1.187	8.141
4 a	Illinois Yellow	Yel	R	Bu B	7.5	6 6	3.75	badly	18	50	.67	.35	.15	1 280	9.34
4 b	Illinois Yellow	Ry	R	W B	7.5	7	3.6	badly	14	45	.63	.36	.17	1.68	7.413
5 a	Pale Yellow	Yel	B	W	9	7.9	3.9	nearly	16	56	.53	.40	.16	1.347	9.37
5 b	Pale Yellow	Yel	R	C B	9	6 6	4.1	scant	18	57	.52	.33	.16	1.171	10.240
6 a	Bloody Butcher	Ry	R	C B	10 1	6.5	3.9	scant	14	53	.60	.36	.19	2.123	10.170
6 b	Bloody Butcher	Ry	R	C B	10.2	6 5	3.75	scant	14	54	.50	.34	.19	1.329	8.303
7 a	Early Canada	Dy	Bu	Bu	10	5	8.1	badly	8	60	.45	.54	.17	0.408	5.437
7 b	Early Canada	Dy	Bu	Bu B	9 5	5.25	3.25	well	8	62	.50	.51	.16	0.403	5.378
8 a	Early King Phillip	Dy	Bu	Bu B	9.5	5	2.9	well	8	47	.45	50	.20	1.59	5.319
8 b	Early King Phillip	Dy	Bu	Bu	7 7	4 4	2.9	well	8	50	.40	.50	.18	0.361	4.352
9 a	Proctor Bread	White	C W	C	8	7.9	4.25	well	20	48	.62	.35	.17	1.288	11.326
9 b	Proctor Bread	White	C W	W R	7.75	7.9	4.87	scant	22	40	.65	.36	.19	1.388	9.392
10 a	Baden	Wh	W	W R	8	6	3.5	scant	16	50	.55	.55	.16	1.180	6.331
10 b	Baden	Wh	W	W R	8.4	5.9	3.25	scant	12	54	.56	.45	.16	1.101	7.163
11 a	Thompson	Wh	C	W B	9.5	6 5	3.75	scant	14	57	.61	.41	.17	1.352	9.37
11 b	Thompson	Wh	C	C B	8	6.7	3.75	scant	16	51	.60	.41	.16	1.151	10.128
12 a	St. Charles White	Wh	R	C B	7	7	3.25	well	16	46	.6	.32	.16	0.401	7.154
12 b	St. Charles White	Wh	R	C B	7.5	7	3.9	well	16	47	.68	.37	.16	1 238	9.324
13 a	Long John	Wh	R	C B	10	5.5	3.4	badly	12	53	.51	.41	.19	1.146	8.155
13 b	Long John	Wh	R	C B	10	6 1	4	well	14	50	.51	.40	.20	1.382	9.341
14 a	Evans, from farm crop	strip'd	R	R	11.75	8	4.5	scant	18	63	.75	.38	.19	1.288	16 405
14 b	Evans, from farm crop	Yel	C	C	11	7.1	4	scant	14	60	.60	.37	.19	2 207	14 398
15 a	Proctor Bread, farm c'p	Wh	C	C	8.5	8 5	1.5	badly	22	43	.6	.4	.2	3 223	13.397
15 b	Proctor Bread, farm c'p	Wh	C	C	8.75	7.9	4.9	scant	22	50	.74	.4	.18	2.371	13.300

EXPLANATIONS OF THE TABLE.

In color, R. Y. stands for *Reddish Yellow*; D. Y. for *Dark Yellow*; R. for *Reddish*; C. for *Cream*; B. for *Brown*; Bu. for *Buff*, and in color of Pith, W. Bu. for *White* with *Buff Circle* around it, and C. B. for *Cream* colored pith with a *Brown Circle*, or in color of pith the first letter gives the color of the pith and the second letter the color of the circle around the pith, when the circle differs in color from the pith itself. The measurements are in inches and decimals of inches.

It is noteworthy that the Evans No. 15 *a*, from field crop of the farm, gives above six ounces more corn to the ear than the Evans No. 1 *a*, from the experimental crop, showing that experimental crops are inferior for reasons above stated. But all fared alike and serve well for comparison.

The table also shows the *Baden* corn most productive, as it gave 498½ pounds, 30 pounds more than the *Long John*, which ranks next. The *Long John*, *Illinois Yellow* and *Proctor Bread* yield nearly equal quantities. The *Evans*, *Proctor Bread* and *Chester County Mammoth* are the largest varieties. The *King Phillip* and *Canada* are the smallest. The King Phillip grows on small stalks close to the ground. The Evans may prove most productive, though it now stands seventh in the grade. The Bloody Butcher and Pale Yellow are least productive.

But the chemical analyses may change the grade.

EXPERIMENT ON TOBACCO.

Several acres of new ground were cleared up and a fine crop of Tobacco was raised upon it. But, while the crop was successfully made and cured, the market price fell so low it did not pay the expense of raising.

ORDINARY FARM CROPS.

The crops of wheat, corn, oats and grass, all were much above average of those staples.

THE SEVENTH EXPERIMENT.

with Indian corn, to show the effect of subsoiling the worn out soil resting on the marles of Bluff Formation in Missouri, gave an excellent yield on land that had been in cultivation more than fifty years, without manure of any kind.

The following is an outline of the experiments made in the Horticultural department during the year, as reported by **PROF. S. M. TRACY**:

In the nursery root grafts of seventy-five varieties of apples, (twenty-six varieties of which were from Russia,) have been planted, and several new varieties of peaches and plums were budded in September. Twelve new varieties of grape vines have been planted, and in November, four thousand Concord cuttings were planted, to test the comparative results of fall and spring planting. Forty thousand cuttings, (twenty-four varieties) were planted in April.

Eleven varieties of Strawberries which were planted last year, fruited well this spring, their comparative value being shown in the following table, in which 10 is taken as the standard of excellence:

VARIETY.	Growth of vine........	Productiveness........	Size........	Hardness...	Flavor......	For market	For family use........	Average....
Springdale	6	4	5	8	7	5	5	5.7
Star of the West	8	6	8	7	7	7	8	7.3
Monarch of the West	6	7	8	8	7	8	7	7.4
Cumberland Triumph	9	8	10	8	9	8	9	8.7
Ida	9	8	4	8	6	5	6	6 6
Captain Jack	8	9	9	9	10	10	10	9.3
Downers Prolific	9	9	8	8	8	8	7	8.1
Susquehanna	5	5	5	7	8	4	7	5.7
Chas. Downing	10	9	8	7	9	7	9	8 4
Seth Boyden	9	8	8	8	9	7	8	8.1
Wilson's Albany	9	9	8	9	6	9	7	8.1
Average	8	7.5	7.4	8	7 8	7.1	7.5	7.6

In the vegetable garden a general assortment of vegetables has been cultivated for market, and careful notes made of the results, with each variety.

In 1877, one hundred and ninety-six varieties of Irish potatoes were tested. After being harvested, about fifty of the least promising sorts were discarded. This spring the remaining varieties, together with about fifty new ones, have been planted. The results of the trial made in 1877 have been preserved for comparison with the results in 1878. Eleven varieties of sweet potatoes are now being tested. In 1877, fourteen varieties of spring wheat, and seventeen of oats were grown. In October last, sixty-one varieties of winter wheat were sown, and this spring, twenty varieties if oats.

Stable manure, street scrapings and slaughter-house refuse have been used as fertilizers, and the results of each will be noted this fall.

A thorough tile draining of about four acres of the garden has been commenced, and will be completed during the present year.

Google

A small pear orchard has been put out, the trees are treated in different ways, to test which mode will be best for preventing *blight.*

FARM IMPLEMENTS,

Such as Plows, Harrows, Cultivators and Mowers and Reapers, of the very best patterns, have been obtained in sufficient quantities to supply our wants for several years. The most of these implements were furnished by the munificence of the manufacturers.

Since the Plow Trial of May, 1877, many of the Plows have been more fully tested in the regular work of the farm.*

PLOWS.

The "Davenport Sulky Plow for Sod and Clayey Soils," has most admirably met our wants for these purposes.

" *The Hughes' Sulky Plow, with sub-soil attachment,"* has proved to be a most excellent and economical implement. It will do the same work as an ordinary Sulky, and a common Sub-soil plow, with about the same draft, thus saving the labor of one hand; since one man can draw and manage the Sulky and Sub-soil attachment.

" *The Walking Plow for Sod,"* of Messrs. SPEAR & SON, is the very best " Walking Plow for Sod" we have used.

" *The Two-horse Walking Plow," Iron Beam,* of B. D. BUFORD & Co., has proved a most excellent plow. It is reserved for the Lecture Room, as a *model plow.*

The Walking Plow, two-horse, of the Moline Plow Co., is a good implement, but we have had but little trial of it as yet.

The Walking Plow of MORRISON & BROTHERS, is a superior plow, and deserves all the credit it received at the Plow Trial.

CULTIVATORS.

The Roberts' Cultivator has proved a good implement.

The " Western Corn Cultivator," of the Moline Plow Co., has proved to be an excellent implement. It has continued to do good work for the great staple of Missouri.

"*The Revolving Cultivator,"* is one of the wonderful inventions of the age. The great variety of uses to which it may be applied, fully off-set the expense. It makes a *good Roller; a Seed Sower; a Plow, for certain purposes,* as preparing ground for oats and clover; *a cultivator,* as for corn.

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* It is deemed a part of the duty of the State Agricultural College, to inform the people of the State what implements have best done the work for which they were designed. This is done alike for implements presented and for those purchased.

This implement has been fully tested as a cultivator, and we unhesitatingly pronounce it the very best instrument to follow the Harrow in cultivating corn.

CHURN.

The Sprague Churn has been used the past year, and has proved to be an economical labor saving butter maker.

REPORT OF FARM DEPARTMENT.

Memorandum of labor, expenses and receipts, for year ending May 31, 1878:

The principal crops raised in 1877, were 33 acres of wheat, 55 of corn and 10 of oats. There are now growing on the farm, 40 acres of wheat, 50 of corn, 6 acres of tobacco, and a few oats. One mile of rail fence has been rebuilt; one-fourth of a mile of new rail fence; 100 panels of picket fence; one-fourth of a mile of temporary fence to protect hedge, and 25 panels of plank fence have been made, and 900 feet of hedge planted. Logs have been cut and hauled for 10,000 feet of lumber.

In 1877, thirteen varieties of corn were tested, and in 1878, fifteen varieties have been planted. A good assortment of fruit trees has been planted, and eighty rods of gravel road made, with 359 loads of gravel hauled.

During the year, 15 head of cattle have been purchased; 7 calves raised, and 14 head of steers sold. A Berkshire boar has been purchased; 40 pigs raised, and 3 sold.

Sixteen acres of meadow land have been broken up; twenty-two acres have been re-seeded, giving about forty-five acres now in meadow.

Expenses and receipts have been as follows:

FARM DEPARTMENT.

	Dr.	
To labor	$901 60	
" Blacksmith	25 00	
" Hardware	21 00	
" Sawing Lumber	75 00	
" Miscellaneous	15 97	
" Stock purchased	234 75	
		$1,273 32

	Cr.	
By Sales (Cash)	$1.208 15	
" Hort. Dep't	45 45	
" Hedge	30 40	
" Gravel Road	157 83	
		$1,441 83
Credit by balance		$168 51
Stock and grain on hand (estimated)		$2,700 00

ROBERT B. MADDEX,
Farm Superintendent.

June, 1878.

REPORT OF HORTICULTURAL DEPARTMENT.

Summary of work during the year ending May 31, 1878.

Nursery—In 1877, about 25,000 Concord grape vines were raised from cuttings, and in 1878, 40,000 cuttings (24 varieties) have been planted. Two thousand apple root-grafts (75 varieties) were planted this Spring. Also, plums, cherries, quinces and peach pits, for budding next fall.

Vineyard—The vineyard has been cultivated as usual during the year, and in the trial vineyard 20 new varieties have been planted.

Orchard—The apple orchard has been seeded with grass to check the too vigorous growth of the trees, and a quantity of small fruits have been planted.

Vegetable Garden—A general assortment of vegetables has been grown for market, and a number of new varieties tested.

Experiments—In 1877, 196 varieties of Irish potatoes: 14 varieties of wheat, and 20 varieties of oats were tested.

During the present year there have been planted 213 varieties of Irish potatoes—including 50 seedlings; 61 varieties of wheat and 20 varieties of oats are being tested.

Hedges—The Osage Orange hedge on the east side of the grounds has been turned out, and the Arbor Vitæ hedge on the north end of the garden, completed. The Osage hedge on the west side of the grounds has been completed, and a division hedge of Barberry planted.

Draining—A thorough underdraining of about four acres of the garden has been begun, and will be completed during the summer.

Detailed statements of work done will be found in the accompanying monthly reports.

Respectfully submitted,
S. M. TRACY,
Assistant Professor of Agriculture.

Columbia, Mo., June 1, 1878.

WHAT THE AGRICULTURAL COLLEGE NEEDS.

What the College most needs is apparatus for the lecture room, as very little has as yet been given to the department of Practical Agriculture.

The Farm needs stables, tool-houses, fences, bridges, roads, and above all a supply of the best breeds of domestic animals.

The Horticultural Grounds need hot and propagating houses, and other fixtures for horticultural operations.

Our teaching must be defective until these necessary means of instruction are supplied.

DONATIONS FOR 1877.

Mr. Lawson Stewart has presented specimens of ancient stone implements, Rocks, Minerals and Fossils.

Mr. E. T. Webb has also presented a collection of Ores.

Capt. C. B. Sanders has donated a valuable collection of Archæological Instruments, in flint and bronze, from the collection of Ralph Westrop, Ravenswood, Ireland.

Messrs. —————————— furnished the Sprague Churn.

The Garden and Nursery are indebted to Mr. J. B. Matthews, Marissa, Ills., for 700 Sweet Potato Plants—7 varieties.

Mr. B. K. Bliss & Sons, New York, for 26 new varieties of Irish Potatoes.

M. S. Tracy, Platteville, Wis., for Plum scions.

U. S. Department of Agriculture, Washington, for 3 new varieties Irish Potatoes; for 3 new varieties Winter wheat; for 32 new varieties Russian Apple scions.

Dr. S. B. Victor, Columbia, Mo., for 2 new varieties Irish Potatoes.

Mr. W. T. Hickman, Columbia, Mo., for 2 new varieties of Irish Potatoes.

Mr. W. W. Garth, Columbia, Mo., for 2 new varieties Irish Potatoes.

Mr. T. B. Miner, Limwood, N. J., for 2 new varieties Strawberry plants.

Dr. E. S. Morse, Columbia, Mo., for 2 stands Italian bees.

OPERATIONS FOR 1878.

During this year the Farm Stock was increased by the purchase:

1. One pair of *Lincoln* Lambs, and one pair of *Leicester* Lambs, all full blooded, and of the best quality. They were purchased of

some of the best Canadian flocks through Mr. W. H. Cutright, of Boone county, Mo.

2. A Boar and Sow of the best *Poland-China* blood from——— through Mr. J. P. McAfee, Secretary of the State Board of Agriculture.

3. Also an Alderney Bull, bred by the late Hon. John W. Harris, of Boone county.

4. And the beautiful Short-Horn Heifer, ADDIE E., 2d, bred by Mr. John S. Hickman, Sen., and purchased at the sale of Messrs. James and Moss Parker, of Boone county.

We have received several munificent donations of fine stock.

5. Mr. J. P. McAfee, of Boone county, presented the splendid Short-Horn Bull, ROYAL FAVORITE, and the beautiful Short-Horn Heifer, PAULETTE, received through the *Journal and Farmer* (for the largest list of subscribers), from the herd of Mr. Charles E. Leonard, of Ravingswood Farm, Bell Air, Cooper county, Mo.

PEDIGREE OF ROYAL FAVORITE.

Red roan, calved December 28, 1877, bred by Charles E. Leonard, Ravingswood Farm, Bell Air, Cooper county, Mo. Presented to the Missouri State University, June 10, 1878. Got by Oakland Favorite, 10,546 A. H. B. 5,568, S. H. R., out of Mayflower, 3d vol. 10, p. 703, by Basil Duke 6,484 do 3,131 do; Mayflower 2d by John O'Gaunt 3,030 do 5,337 do; Mayflower by imp. Yorkshire Maynard 2,401 do 1,322 do; Flora by Exchange 1,523 do 861 do; Betty by Eclipse (1949) E. H. B., 1840 do; imp. Adelaide by Magnum Bonum (2243) do 340 do; Beauty by George (1066) do 234 do; Beauty by Lancaster (860) do 318 do; Clara by Lancaster (360) do 318 do; Venus by Wellington (680) do 574 do; Venus by George (275) do 232 do; Venus by Favorite (252) do 204 do; Venus by Punch (531) do 454 do.

PEDIGREE OF PAULETTE.

Red, calved September 22, 1877. Bred by Charles E. Leonard, Ravingswood Farm, Bell Air, Cooper county, Mo. Presented to the Missouri State University June 10, 1878. Got by Monarch 14,941 A. H. B. 5,532 S. H. R. out of Pauline (vol. 12 A. H. B., p. 1,120), by Oakland Favorite 10,546 do 5,568 S. H. R.; Bona by Airdrie 9,411 do 4,678 do; Beatrice by Malcolm 10,436 do 5,461 do; Lavinia by Malcolm, 10,436 do 5,461 do; Leontine by Comet Star 9,676 do 4,900 do; Queen by imp. Acmon (1,606) C. H. B. 3 do; Lady Paley by imp. Rantiple (2,478) do 1,112 do; imp. Flora by Son of young Albion (15) do 594 do; young Red Neck by Marton (420) do 1,005 do; Red Neck by Palmson (1,302) do 1,065 do; by Parrington (1,305) do.

6. A pair of fine Cotswold Lambs, presented the College by the same distinguished breeder and patron of Agricultural Education.

7. A pair of full-blooded Merino Lambs, presented by Hon. James Harris, of Boone county, one of our best farmers.

8. We also have a fine Leicester Lamb, presented the College by Messrs. James and Moss Parker, the well-known breeders of Boone county, Mo.

9. A pair of Lambs presented the College by Mr. R. B. Price, of Columbia, Mo., from his flock of superior South Downs.

EXPERIMENTS IN CORN FOR 1878.

Fifteen varieties were planted on the 5th of May, on old Hickory land, which has long been in cultivation without any fertilizers. The cultivation was such as we give our field crops. The severe drought of August and September rendered the crop light, the ears and kernels small.

The Evans stands first, 426; Proctor Bread second, 414; and Illinois Yellow third, 405.

COMPARATIVE TABLE OF THE CROP OF 1878.

NAME OF CORN.		Date of ripening....	Total weight of corn..........	No. of stalks.........	No. of ears...........	Color of corn.........	Length of ear.......	Circumference of ear..................	How filled out......	No. of rows on ear.	No. of kernels in row..................	Weight of corn on ear......................	Length of kernels..	Width of kernels...	Thickness of kernels	Circumference of cob	Weight of cob......	Color of cob.........	Color of pith.........
Evans..	A	Sep. 5	420	200	205	Y	10 9	4.5	Well.	20	59	14 235	.62	.34	.16	4 5	2.230	R	C B
	B						9.9	4.3	Well.	18	62	12.831	.66	.29	.13	4.3	1.805	R	C B
Chester County Mammoth..............	A	Sep. 15	362	223	220	Y	9.3	6.6	Well.	18	57	8.780	.52	.34	.16	4.0	1.905	R	C B
	B						9.4	6 0	Well.	14	52	7.214	.42	.40	.16	4.1	1.800	R	C B
Early Yellow..	A	Aug. 20	314	230	228	Y	8.8	6 1	Well.	18	61	7.869	.54	.29	.14	3.8	.908	R	W B
	B						8.4	6.4	Fair.	14	49	6 314	.43	.40	.14	4.0	1.354	R	C B
Illinois Yellow....................................	A	Sep 5	405	234	233	Ry	10.3	6 2	Fair	14	52	9 137	.54	.35	.17	3.6	2.033	R	Bu B
	B						10.4	6.0	Fair	12	55	9.260	.55	.38	.16	3.0	1.956	R	W B
Pale Yellow...	A	Sep. 10	328	223	220	Y	9.3	6.6	Well.	18	47	10 145	.55	.35	17	3.7	1.359	R	W
	B						8 5	7.3	Fair.	16	40	8.568	.53	.39	.21	5 0	2.025	R	C B
Bloody Butcher..................................	A	Sep. 15	292	257	221	Ry	10.1	6.1	Fair.	14	46	7 833	.47	.39	.20	3.8	2.025	R	C B
	B						8.9	6.0	Fair	12	48	6.897	.48	.39	.18	3.8	1 819	R	C B
Early Canada	A					Y	7.2	4.3	Scant	8	34	2.247	.31	.40	.15	2.8	.476	C R	Bu
	B						7.5	4.3	Fair.	8	46	3.387	.37	43	.15	2.7	.902		Bu B
Proctor Bread......................................	A	Sep. 10	414	219	222	W	8.9	7.6	Well.	18	56	12.285	.53	.34	.16	4.5	1.815	C W	C
	B						8.8	7.0	Well.	18	52	11.205	.53	.34	.17	4 2	1.792	C W	W R
Baden..	A	Sep. 5	358	200	224	W	9.4	5.4	Well.	12	49	7 876	.48	.37	.17	3.4	1.394	W	W R
	B						8.8	6.9	Fair.	10	56	6.980	.45	.42	.14	3 6	1.584	W	W R
Thompson...	A	Sep. 10	320	238	214	W	7.9	5.9	Well.	16	56	7.981	.50	.27	.12	3.2	.910	R	C B
	B						9.2	7.1	Fair.	14	50	8.558	.56	.40	.20	4.2	1.602	W	C B
St. Charles White............................	A	Sep. 12	403	240	250	W	9.1	6.6	Well.	16	57	9.919	.56	.34	.15	3.9	1.812	R	C B
	B						8.6	6.4	Well.	16	56	7.875	.57	.29	.16	3.5	1.143	R	C B
Long John...	A	Sep. 15	384	200	194	W	11.2	6.7	Well.	14	64	12.402	.53	.45	.16	3 9	2.040	R	C B
	B						12.0	6.0	Well.	12	61	10.359	.46	.43	.21	3 9	2 450	R	C B
Gold Dust..	A	Sep. 15	358	204	190	Y	9.4	6 6	Well.	16	54	8.792	.53	.34	.19	4.3	1.575	R	W Bu
	B						9.2	6 3	Fair	14	56	7.425	53	.35	.15	8.6	1.127	R	C B
Jersey Red..	A	Aug. 15	275	240	237	Ry	8.8	6.1	Well.	14	45	8 327	.50	.37	.15	3.8	1 601	W	W B
	B						9 2	6.4	Fair.	16	48	8,556	.52	.37	.15	4.0	1.800	W	C B
New Madrid...	A	Sep. 15	338	183	164	Y	10.4	6.5	Well.	16	53	8.110	.46	.37	.15	4.4	1.584	R	C B
	B						9.0	6.5	Well.	12	53	8 779	.55	.41	.16	8 8	1.589	W	W B

EXPERIMENTS WITH IRISH POTATOES.

On May 11, 1878, one hundred and seventy-seven varieties of Irish potatoes were planted. One hundred and forty of these varieties were selected from the best raised in 1877; twenty-seven were unnamed seedlings, raised by B. K. Bliss & Sons, of New York; three varieties, Beauty of Hebron, Ruby and Victor, were from the Department of Agriculture at Washington, and the others from our farmers.

The potatoes were raised on hickory land, which had been in clover and blue grass for many years, the most of the time as a pasture. It was plowed early in the spring and just before planting was thoroughly pulverized with a rolling harrow. The Potatoes were cut in pieces of about two eyes each, and planted four inches deep in drills, four feet apart, and eighteen inches apart in the drill. No manure was applied, and ordinary field culture was given.

Some of the results obtained are shown in the following table. The date of ripening is the date when the stalks appeared dead. The weight given is that of an *average* specimen. The diameters of the weighed Potato are given as measured in three directions, the first being the diameter from the stem to the seed end, and the other two in directions perpendicular to the first and to each other, so that the average form of the tubers is shown.

COMPARATIVE TABLE OF POTATOES RAISED IN 1878.

NAME.	Date when ripe.	Yield per year....	Color..........	W't of Average Specimen.	Diameter.		
					A	B	C
Alpha	Aug 25	53	W	2.27	3.0	1 4	1.2
Andes	Sept 3	54	W	5.52	3.7	2 3	1.6
Beauty of Hebron*	Aug 20	112	W	12.37	5.1	3.0	2.4
Buckeye	Sept 3	86	W	8.18	3.6	2.9	2 3
Carpenter	July 15	55	W	1.36	2.6	1.2	1.1
Carter	July 17	67	W	4.17	2.9	2.4	1.8
Cherry Blow	Sept 3	128	W	5.68	3 3	2.4	2.1
Climax	Aug 19	129	W	2.86	2.5	1.9	1.8
Cowhorn	Aug 19	61	Pu	2.39	4.2	1.3	1.1
Davis Seedling	Sept 3	55	R	2.28	2.2	1.7	1.5
Duke of Cumberland	Sept 3	185	W	4.18	3.3	1 9	1.1
Early Cottage	Aug 17	52	W	2.14	2.6	1.6	1.5
" Dexter	July 15	101	W	4.16	3.0	2.0	1.9
" Don	Aug 1	182	W	6.47	3.7	2.6	2.1
" June	July 10	88	W	5.17	3.6	2 5	1.8
" Kidney	Aug 5	63	W	4.46	2.9	2.2	1.7
" Mohawk	Aug 1	115	W&pu	5 21	3.1	2.2	1.8
" Rose	Aug 19	170	Pi	13.17	5.4	2.9	2.3
" Snowball	July 25	56	W	5.00	3.4	2.0	2.0
" Vermont	Aug 25	270	Pi	10.87	4.2	2.5	2.1
" White	Aug 5	72	W	4.30	3.8	1.9	1.8
Extra Early White	July 20	115	W	4.13	3.2	2 2	1.9

COMPARATIVE TABLE OF POTATOES RAISED IN 1878—Continued.

NAME.	Date when ripe.	Yield per year...	Color............	W't of Average Specimen	Diameter.		
					A	B	C
Giddings	Aug 10	87	W	4.14	2.6	2.2	1.8
Harrison	Aug 19	55	W	3.47	3.4	1 7	1.7
Kansas	Aug 17	52	W	5.37	3.4	2 2	1.7
Lapstone Kidney	Sept 3	56	W	3.86	3 7	2.1	1.6
Long Pond	Aug 19	81	W	3.77	3.1	2 0	1.2
Massachusetts White	Aug 17	59	W	2.21	1.9	1.7	1.7
Missouri Round	July 25	50	W	2.86	2.4	2.0	1.8
Nova Scotia	Sept 3	55	Pi	1 96	3 3	1.2	1.2
Ohio Russet	Sept 3	67	W	4 66	3.2	2.1	2.0
Peachblow No. 1	Aug 19	74	W	2.36	2.4	1.9	1.3
" No. 2	Oct 20	94	W &R	4.87	2.8	2.7	2.4
Ruby*	Aug 20	69	W	4.57	3.6	2.1	1.8
Search Warrant	Sept 3	80	W	4.40	3.9	1.7	1.7
Snowflake	Aug 10	220	W	10.24	4.1	2.9	2.2
Victor*	Sept 3	154	Pu	9.16	3.8	2.9	2.7
"	Aug 19	91	R	5.00	3.1	2.0	1.8
White Neshannock	Sept 3	246	W	8.74	5.3	2.3	2.0
York Seedling	Sept 3	168	W&pu	5.66	3.8	2.1	2.0
Seedlings from B. K. Bliss & Sons, New York:							
A	Aug 16	167	W	5.72	3.3	2.3	1 6
B	Sept 20	178	W	6.04	3.3	2.5	2.0
C	Aug 5	182	W	7.72	3.3	2.7	2 2
D	Sept 3	165	R	5.67	3.0	2 5	2.1
E	July 25	91	W& R	6.45	8.2	2.6	1.9
F	July 15	139	Pi	3.06	3.0	2.0	1.4
G	July 15	104	W	4.73	8.1	2.4	1.9
H	July 22	25	W	1.47	2.4	1.5	1 1
I	Sept 3	29	W	6 42	3.3	2.6	2.0
J	Sept 3	26	R	4.22	1.6	2.2	1.5
K	Aug 5	182	W	8.96	4.6	2 8	2.0
L	Sept 3	101	Pi	4.17	3.0	2.3	1.9
M	Aug 1	181	W	3.86	3.6	1.9	1.5
N	July 20	151	Pi	4.94	3.4	2.2	1.8
O	Sept 3	162	R	3.68	2.7	2.3	1.6
P	Aug 10	25	W	2.88	2.9	1.8	1.5
Q	Sept 3	20	W	2.21	3.7	1.5	1.3
R	Aug 1	254	W	6.23	3.5	2.3	1.9
S	Aug 5	149	R	10.02	3.9	3.0	2.0
U	Sept 5	191	W	4.42	3.5	2.1	1.6
V	Sept 3	140	W	2.48	2.0	2.0	1.8
W	Sept 3	103	R	3.87	2.8	2.2	1.8
Y	Sept 3	132	W&pu	4.09	2.6	2.2	1.8
B—1	July 20	58	W	1.63	2.0	1.6	1.4
B—2	July 25	59	W	3.40	2.7	2.1	1.7
B—3	Aug 10	122	W	5.58	3.6	2.2	1.8
B—4	Aug 5	269	W	7.18	4.2	2.4	1.7

EXPLANATIONS.—W. White; Pu. Purple; Pi. Pink; R. Red; * from Department of Agriculture. Among the better known varieties which yielded less than fifty bushels per acre, were Acme, Black Chenango, Prince of Wales, Chili Early Goodrich, Fluke, Peerless and White Merino.

The season was a very unfavorable one, and the crop suffered severely from the intensely hot and dry summer, and when harvested many varieties were found badly rotted. Among those which suffered most from rot, were Massachusetts White, Andes and Victor. Among those which succeeded best were Early Rose, Early Vermont, White Neshannock and Beauty of Hebron.

Among the seedlings sent here by B. K. Bliss are several of great promise, but as they are unnamed and entirely unknown, no special report is given.

In addition to the varieties noted above, a large number of varieties were raised from seed sowed in 1877, and a quantity of seed has been saved for sowing in 1879. It is hoped that by originating varieties here, some may be found which will be better adapted to our climate than are any we now have.

EXPERIMENTS WITH WHEAT IN 1878.

During the past year sixty-one varieties of wheat were sown on the College Farm. Twelve varieties, the seed of which came from Russia and Oregon, were entirely winter-killed. One variety, the "Rough Chaff," was ruined by rust, and the remaining forty-eight varieties gave the results shown in the following table:

COMPARATIVE TABLE OF WHEAT RAISED IN 1878.

VARIETY.	Date when Harvested	Color of Grain	Height in Feet	Weight per Bu.	Bushels of Grain per Acre	Weight of Straw per Acre	Wt. of Straw per Bushel of Grain	Smooth or bearded	Size of Grain
Amber	June 21	A	3½	55	20.16	2576	127.8	S	s
Arnold's Hybrid	do 19	A	4	59	33.23	4592	140.7	S	l
Chidham	do 29	W	3	52	3.37	3690	109.5	S	s
Clawson	do 21	W	4½	58	28 07	2646	96.4	S	vl
Deibl	do 21	W	3	55½	14.42	2096	145.3	S	s
Dott	do 19	R	3½	59	31 04	3904	125 8	B	l
Fultz*	do 17	A	4	59	15 23	1728	113 5	S	m
Gold Medal†	do 24	W	4	57½	17.39	1886	108.5	S	l
Grecian White‖	do 29	W	3	53	5 87	1263	215.2	S	s
Hert's White‖	do 29	W	3	52½	8.12	1808	222.6	S	s
Jenning's White	do 19	W	3	59	24 96	2848	114.1	B	m
Kentucky	do 11	W	4	58½	25.76	3920	152.2	S	l
Lammas‖	do 29	R	3½	52½	11.56	2944	254.7	S	s
Louisiana	do 21	W	3	55	19 49	2952	151.5	S	s
Mediterranean	do 17	R	4	61	21 92	3194	145 6	B	vl
Michigan Wick	do 21	W	3	57½	28.32	3245	114.6	B	l
Muskingum‡	do 19	A	3½	58½	21.92	3088	140.9	S	m
Nursery§	do 25	W	3½	52½	13 30	2248	162 0	S	s
Oregon**	July 3	W	2½	51½	9.60	1376	143.3	S	s
Oregon Champion‖	June 29	W	3½	54½	7.76	1680	216.5	S	s
Oregon Club‡	do 21	W	4	56	28.80	3600	125.0	S	s
Post	do 25	W	3½	52	19 49	2952	151 5	B	l
Red Lancaster	do 18	R	4	60	24.65	3552	144.0	B	vl
Red May	do 8	R	3½	59	27 52	3024	110.5	S	s
Red Russian	do 19	R	3½	60½	24 00	4016	167.3	B	vl
Sanford	do 24	W	4	59½	18.82	1952	103.7	B	l
Shumaker	do 17	A	4½	60	30.56	4628	151.3	S	vl
Silver Chaff†	do 25	W	4½	59½	17.82	1858	104.3	S	l
Tappahannock	do 10	W	3½	59½	20.32	2064	100.2	S	m
Touzelle§§	do 25	R	4½	56½	15 68	1952	124 5	S	vl
Treadwell	do 21	W	3½	57½	19.52	3227	165.3	S	l
Trump‖	do 29	W	3½	50	13.94	3424	245 6	S	s
Victoria	do 29	W	4	54	9 41	2584	274.6	S	s
White Rogers‡	do 19	W	4	59	38.72	4304	111.2	B	l
Zimmerman	do 15	R	3½	60½	16 32	2224	136.3	S	s
Russian, No. 1	do 29	A	3½	55½	14.21	2608	183.5	S	m
do No. 2‡	do 9	W	3¼	60	23.36	2558	100 5	S	l
do No. 3	do 29	R	3	50½	8 30	1872	212.7	S	l
do No. 4	do 25	R	4½	57	26.40	2992	113.3	S	l
do No. 5‖‖	do 29	R	3½	48	21.12	4320	204.6	S	s
do No. 6‖	do 29	R	4	57	10.72	2048	191.0	B	s
do No. 7‖	do 29	R	4	51½	5 89	1293	219 5	S	s
do No. 8‡	July 3	W	4½	58	31.52	3952	125 4	S	l
do No. 9	June 29	R	4½	57½	24.48	4912	200.6	B	l
do No. 10	do 29	R	4½	57½	17 44	4000	229.4	B	m
do No. 11‖	July 3	R	3½	54½	7 38	2048	277.5	S	s
do No. 12‖	do 3	R	3½	52	9.41	1728	183.6	S	s
do No. 13	do 3	A	3½	56½	16 80	2944	174.0	S	m
Average				56½	18 85	2840	179.7		

Explanation:—A., amber; R., red; W., white; B., bearded; S., smooth; s., small; l., large; v. l., very large; * seed very odd; † injured by cattle; ‖ badly shrunken; ‡ very plump; § shrunken; ** very poor; §§ blighted badly; ‖‖ "club" wheat.

This wheat was raised on hickory land, which was in oats in 1877 and in corn for many years previous. It had been subsoiled twice within eight years. In September, 1877, it was plowed ten inches deep, thoroughly pulverized with the harrow and clod-crusher, and the wheat sowed with a drill on September 29, at the rate of one and a half bushels to the acre.

It will be seen from the above table that the time of ripening varied from June 8th to July 3d—a fact which would be of great advantage to those having large amounts of wheat to harvest, as by sowing the earliest, medium and latest varieties the time of harvest could be prolonged nearly four weeks. It will also be seen that by far the largest number of the varieties, yielding more than twenty bushels per acre, ripened between the 17th and 21st of June, indicating that the most profitable sorts are neither the earliest nor the latest. It is true the early varieties are less troubled by the Hessian fly and rust, but, fortunately, with the single exception noted above, this crop suffered from neither of these drawbacks. One of the most valuable columns in the table is the seventh, showing the weight of the straw to each bushel of grain, as the straw takes a large amount of nutritious matter from the soil, and is of comparative little value to the cultivator. In those varieties yielding twenty or more bushels per acre, the amount of straw per bushel varied from 96.4 lbs. in the Clawson, to 204.6 lbs. in the Russian No. 5—a difference of 108.2 lbs. in favor of the Clawson.

A few of the Russian varieties, (the seed of which was received from one of the agricultural schools of Russia,) promise well and may produce something of value when they have become acclimatized. They are nearly all characterized by very long heads and heavy straw. The Oregon varieties seem quite unfitted for our hot, dry climate. The English sorts, Chidham, Lammas, Hert's White, etc., are also very poor. Quite a number of these varieties were tested during the past year at the Michigan Agricultural College. The yield per acre was as follows for some of the leading varieties: Shumaker, 40.8 bu.; Fultz, 38.5 bu.; Michigan Wick, 36.88 bu.; Jennings' white, 34 bu.; Clawson, 24.88 bu.; Mediterranean, 24.88 bu.; Muskingum, 25.5 bu.; Treadwell, 23.8 bu.; Deihl, 23.3 bu.; Arnold's Gold Medal, 23 bu.; Arnolds' Hybrid (red), 30.1 bu. The remaining varieties varied in yield from 0.85 bu to 20 bu., but most of them below ten bushels, results which very nearly agree with those secured here.

The experiments in wheat and potatoes are under the immediate supervision of Prof. Tracy, and those in corn, domestic animals, under Mr. Maddex.

FARM IMPLEMENTS.

DICKEY'S AUTOMATIC GATE.

This gate, manufactured by P. S Warren, Marshall, Mich., we have had in operation nearly one year, and find it the best of its kind. It must be well set, with firm and substantial posts for the catches, as well as the gate. It works promptly, and with a precision superior to intelligence.

G. C. SWALLOW,
Dean of Agricultural College.

REPORT OF THE MISSOURI PLOW TRIAL AT THE MISSOURI AGRICULTURAL COLLEGE.

Your Committee, to whom was entrusted the duty of holding a plow trial, under the joint auspices of the Missouri Agricultural College, the Boone County Grange, and the Boone County Agricultural and Mechanical Association, held that trial on the college farm and the adjoining lands of Mr. Marvin Banks, on the 16th--20th of May, 1877, and would now submit the following report of the result of said trial:

Fifty entries were made, from six different States, representing many of the best manufacturing establishments on the continent.

The attendance was large and enthusiastic. All present were pleased and instructed by the grand display of instruments, by the skill with which they were managed, and by the perfect work they executed.

The Walking Plows elicited the applause of all for their perfection in structure and workmanship, and for their excellent work; but the elegant Sulky Plows and their superior work with little labor, commanded the enthusiastic admiration of all. Even fair ladies thought that plowing with the sulky would not be the worst work a woman could do.

It is a rare treat to see the best plows of the world at their work under the management of the best plowmen.

It was a contest of giants for the grand prize of furnishing the farmers of Missouri with the best plows of the world to cultivate their rich soils.

Every point was fairly and closely contested by worthy competitors, and very many of the plows developed some points of superiority. It was an honor to be second or even third in a contest with the champion plows of the country. Many of them came with their victorious laurels, green from the great plow trials of the continent; as the "Avery," from Ottawa; the "Davenport," from Lafayette, and the "Collins," from Utica.

Had three other plows been present, we should have had the victors at all the great plow trials in the world. We only lacked the "Howard," which took the laurels at Paris in 1855; the "Busey," which took the prize medal at London in 1850, and the "Holbrook," which was victorious at Utica in 1867. These we will have at our next trial.

Four long days were devoted to a careful testing of the plows entered for the trial.

REGULATIONS WHICH GOVERNED THE PLOW TRIAL HELD AT THE MISSOURI AGRICULTURAL COLLEGE, MAY 16TH—20TH, 1877.

I. Points tested in the Sulky Plows and Sulky Attachments.

1. *Quality of Work*—The depth and width of furrow, degree of pulverization and style of the whole work to be considered.

2. *Adjustability*—Under this head will be considered the manner and facility of making all necessary adjustments.

3. *Durability*—The kind and quality of material, liability to wear or break, or in any way be disabled, are to be noted.

4. *Simplicity*—The simplicity of construction and mode of operation, will be examined under this head.

5. *Draft*—The draft will be measured by the Dynamometer in the following manner:

II. Rules for the Dynamometer Test.

This test will be made on even, uniform ground, and each plow will have one furrow to prepare the ground, and then two trial furrows, in which the draft will be marked at six points, as follows:

1. Three parallel lines will be drawn on the land, ten feet apart, and at right angles to the furrow.

2. Three *callers* will stand at these lines and, as the plow crosses each, they will call *one*, *two* and *three*, for the first, second and third line crossed.

3. As each of these numbers are called, the Reader of the Dynamometer will call the draft.

4. Two time-keepers will note the time between the call of *one* and *three*, which will give the time for the twenty feet of furrow turned during the tests.

5. The measurer, with instruments made for the purpose, and which secure absolute accuracy, will measure and call the depth and width of the furrow where the lines above named cross it.

6. The depth of the furrow shall not be less than eight inches, and but one inch more than the width of the plow will be counted in the width of it. The depth for Prairie Breakers shall not be less than four inches.

7. The *yokes* must slide perfectly free on the *poles* of the Sulky Plows.

8. All the facts and numbers called will be recorded and afterwards calculated and tabulated by Joseph Ficklin, Professor of Mathematics in the Agricultural College. Prof. Ficklin will know no plow save by its number. The manufacturer's name will be placed in this table instead of the number of the plow, by the Secretary. It will thus be seen that the judges will have no voice in estimating the draft. The Dynamometer itself must decide that.

III. These *Test Points* will be rated as follows, for perfection, on a scale of 100 for all:

1.	Quality of work	25
2.	Adjustability	20
3.	Durability	20
4.	Simplicity	15
5.	Draft	20
	Perfection in all will give a grade of	100

But three of these Points, the 1st, 3d and 5th, will be noted in the Walking Plows, and they will be rated as follows:

1st.	Quality of work	35
3d.	Durability	30
5th.	Draft	35
	Perfection in all will give	100

IV. When a Plow is entered, it will be numbered, and have the number attached to it in plain characters. Every plow thus entered will be called and known by its number throughout the trial.

Plows may be entered in the following classes, according to their construction: *Sulky Plows*, *Sulky Attachments*, *Walking Plows*, *Gang Plows*, *Reversible Plows*, *Subsoil Plows*, *Prairie Breakers and Sod Plows*.

V. Plows not in any class will be tested and the results given in an appendix to the tabulated results.

VI. The representatives of the plows will manage their own plows, without interruption from other parties; and each shall have his land and the judges entirely to himself while plowing, and may make such representations of the qualities of his plow and its work, as may be deemed advisable.

VII. All the representatives of the various plows agreed to make no criticism on any plows other than their own.

VIII. The Committee of Arrangements will appoint five good practical farmers as *judges;* but, if any one of them be objectionable to the representatives of any plow on trial, his place will be filled by another until all parties are satisfied.

When a plow is called, each judge will receive a card, on which will be the number of the plow and the points to be tested; and each judge, independent of the others, will record his judgment against each point. And when the next plow is called, he will give his card to the Secretary of the Committee and receive another with the number of the plow called.

From these cards the Committee will make up and tabulate the decisions of all the judges on all the tests of all the plows.

The Committee will not appoint any one a judge who has any interest in the manufacture or sale of any plow on trial.

IX. It is best for each manufacturer to send some one to manage his plows; but, if any plow is intrusted to the Committee of Arrangements, it will have a fair trial and be managed by skillful hands.

X. The ground to be plowed is very uniform in quality, and will be staked off into lots of $\frac{1}{8}$ of an acre.

The representatives will draw lots for the order in which they will be called; and when called, will take the lots in order, beginning at the end of the field.

XI. The Committee of Arrangements will have control of the field and plows at all times during the trial.

Under these rules, which were satisfactory to all, the *Great Plow Trial* was conducted. The rules were rigidly enforced, and perfect harmony and satisfaction were the result. For four days the contest of the plows went on, and the multitude looked on with pleasure and delight to see the *best plows* of the world under the *best plowmen* of the world do so grandly well the work that most of all feeds and clothes the world, and makes its civilization and culture possible.

At the close, the Committee of Arrangements published the following recognition of the aid rendered them by the various gentlemen named:

ACKNOWLEDGMENTS OF COMMITTEE OF ARRANGEMENTS.

The undersigned, Committee of Arrangements for the plow trial, grateful for the aid which enabled them to secure the greatest success, would publicly acknowledge their obligations to Dr. S. S. Laws, President of the University, for his prompt and active co-operation; to Prof. Joseph Ficklin, for the rare ability with which he managed and calculated the Dynamometer tests, and to his assistants in making the observations; Prof. W. H. Cole and Mr. J. F. Stewart as measurers; Messrs. O. L. Davis, F. B. Young and B. F. Venable, as time-keepers; Mr. Henry T. Curtright, reader of Dynamometer; Messrs. D. R. Harris, T. L. Montgomery, J. H. Davis, T. J. Paine and D. R. Kemble, as line callers; to the Judges, Messrs. John Walker, R. P. Glenn, Smith Wilhite, James Boggs, H. C. Phillips and J. A. Boulton, for their patient labors in making their many awards; to Mr. S. M. Tracy, Secretary of the committee, for his valuable aid in our extensive correspondence and the regularity with which the plows were entered for this work; to Mr. Trew Hays, for his valuable assistance in the Secretary's work, and to Mr. R. B. Maddex, Superintendent of the Agricultural College Farm, for his most valuable services in giving the plows entrusted to this committee a fair test, and his assistance at all times in all departments.

We would also express in the strongest terms our obligations to the representatives of the various plows and manufacturing companies, for the gentlemanly and faithful manner in which they presented the claims of their various plows; and to the citizens of Boone county for their ready co-operation and appreciation of the results obtained.

G. C. SWALLOW, Dean of Agricultural College.
J. P. McAFEE, Master Boone Grange.
W. L VICTOR, }
W. T. HICKMAN, } From Boone Grange.
S. B. SPENCE, }
J. G. POTTS, }
J. I. STERNE, } From the Boone County Agricultural and Mechanical Association.
J. C. GILLASPY }
Committee of Arrangements.

After the trial was ended, the representatives of the plows present passed and published the following paper:

RESOLUTIONS OF THE MANUFACTURERS.

COLUMBIA, Mo., May 19, 1877.

A meeting of the representatives of plows engaged in the field trial on the college farm of the Agricultural College, of the State of Missouri, having been called at 1 o'clock P. M., this day, the meeting was called to order by Mr. J. K. Chritzman, of the Princeton Manufacturing Company, Princeton, Ill., who called upon Mr. J. A. Templeton, of the Weir Plow Company, Monmouth, Ill., to state the object of the meeting. In a few chosen words, Mr. Templeton stated that the meeting was called for the purpose of making an expression of satisfaction as to the impartial manner in which the trial had been conducted, and of pleasure at the manner of our reception and treatment by all connected with the same.

Mr. L. M. Buford, of B. D. Buford & Co., Rock Island, Ill., was then elected president, and Mr. C. A. Baker, representing the Moline Plow Co., Kansas City, Mo. was chosen secretary. It was then moved and seconded that a committee on resolutions be appointed by the chair to consist of one representative from each firm present. Motion carried. The chair then appointed Mr. J K. Chritzman as chairman of said committee, and authorized each firm present to elect its representative, which was done. The committee reported the following preamble and resolutions; which were unanimously adopted, after which the meeting adjourned *sine die:*

WHEREAS, The officers of the State Agricultural College at Columbia, Mo., in connection with the Boone County Grange, and Boone County Agricultural and Mechanical Association, for the purpose of bringing together a large number of plows to be tried in the soil of Missouri, issued a notice to all manufacturers that a trial of plows would be held, commencing May 16, 1877, and be continued until the jury were satisfied that all plows present had an opportunity to demonstrate their ability to perform the work claimed for them; and,

WHEREAS, The trial has been held in accordance with the circular issued.

Resolved, That we, the representatives of the various plows engaged in the trial, overwhelmed with the hospitality extended to us by the residents of this city and vicinity; by the kind attention, exceeding fairness and impartiality of the jury and officers controlling the trial, wish to express our appreciation of the same, and shall ever remember the plow trial at Columbia, Mo., as one of the most pleasant events of our lives, and shall carry with us to our distant homes none but the most pleasing recollections of this, our first visit to this city.

Resolved, That to the ability and judicial impartiality of Prof G. C. Swallow, the science and fidelity of Prof. Ficklin, the genial and indefatigable industry of Secretary S. M. Tracy, the urbanity, courtesy, kindness and attention of J. P. McAfee, to the whole committee of arrangements, and to R. B. Maddex, the gentlemanly and eminently practical Superintendent of the College Farm, we are particularly indebted for the marked success of this, THE MOST THOROUGH, SCIENTIFIC AND EXHAUSTIVE CONTEST OF PLOWS we have ever attended.

Resolved, That in the foreman of the jury, Col. John Walker, and his associates, Messrs. R. P. Glenn, Smith Wilhite, James Boggs, J. A. Boulton and H. C. Phillips, we have found gentlemen thoroughly skilled in husbandry, as well as the embodiment of honor and impartiality, and for their uniform patience and forbearance with our little peculiarities, and their untiring industry, we hereby return our especial thanks.

Resolved, That inasmuch as the interest of the farmer and manufacturer are intimately associated, we, as manufacturers, wish you success in this and every other praiseworthy effort to develop the boundless agricultural resources of the great State of Missouri.

Resolved, That the secretary be, and he is hereby instructed to furnish a copy of the above preamble and resolutions to the secretary of the committee of arrangements, and also to the Boone county papers, the Journal of Agriculture and Farmer, St. Louis, the Western Agriculturist, Quincy, Ill., and Colman's Rural World, St. Louis, Mo., for publication.

Signed,

R. D. BUFORD & CO.,
HUGHES RIDING PLOW CO.,
DAVENPORT PLOW CO.,
PRINCETON MANUF'G CO.,
MORRISON BROS.,
H. H. CANADAY,
WEIR PLOW CO.,

B. F. AVERY & SONS.
L. LINGER,
SYCAMORE HARVESTER M'F'G CO.,
PEORIA PLOW CO.,
S. NORRIS.
WM. STARLING,
MOLINE PLOW CO.

C. A. BAKER, Secretary.

EXPLANATIONS.

DRAFT.

The draft in this plow trial should be greater than usual, for three reasons:

The furrows were cut deeper than usual; and it takes more power to move the deep than surface soil.

The soils were extremely wet at the close of a long, heavy rain.

The soils were very compact and hard, as they had not been cultivated for several years, and besides, the bluegrass sod land was plowed a little deeper than ever before, the plows cutting down into the stiff, clayey subsoil.

The soils were made up largely of sands and clays, the very heaviest soil material, and but little light organic matter.

WEIGHT OF SOILS.

The bluegrass sod, in which the sod plows were tested, was heavy hickory land; it had been exhausted by cultivation, and had remained in bluegrass pasture for several years prior to the trial.

The old corn land, in which the other plows were tested, was low, sandy bottom land of the very heaviest kind.

WEIGHT OF SOILS AND SOIL MATERIALS PER CUBIC FOOT.

	WET.	DRY.
Silicious sand	136.1	111.3
Calcareous sand	141.3	113.6
Pure clay	115.8	75.2
Carbonate of Lime	103.5	53.7
Carbonate of Magnesia	76.3	15.8
Humus	81.7	34.8
Rich garden soil	102.7	68.7
Good field soil	109.1	74.5
Our bluegrass sod	116.6	79.6
Our bottom soil	125.7	102.7

It will be seen by this table that garden soil, which contains much humus, or decayed organic matter, weighs but 102.7 lbs., and ordinary field soil only 109.1 lbs., while our bluegrass sod weighed 116.6, and the old sandy bottom soil weighed 125.7 per cubic foot, requiring much more draft than common soils. But these soils were so uniform in structure and composition that each plow had a fair competition, and the results, with all the care taken to have them fair and exact, must give the comparative draft of the plows tested very nearly accurate.

It may be proper to state that there are several sources of error which we were not prepared to wholly remove.

1. The driver may lesson the draft many pounds by pulling on the reins, as shown in tests of No. 38. This is applicable to the Sulky Plows only.

2. The plowman may lesson the draft by pushing on the handles of the plow. This is applicable to the Walking Plows only.

3. The width and depth of the furrows were not gauged to the exact standard.

4. The speed of the teams varied much, and though we reduce all to the same speed in the calculations, there still remains a small error in favor of the slow teams; as a plow will move more soil with the same draft when moving slowly than when moving fast.

Mr. John J. Thomas, in his work on farm instruments, says: "Friction is entirely independent of velocity," and "The same rule, nearly, appears to apply to force cutting the earth." But it is well known that solids driven through water, meet a resistance proportionate to the square of the velocity; and that soils present a resistance intermediate in character between the resistance of water (not all friction) and the friction of solids. Hence the resistance of the soil to the plow increases faster than the velocity; though this increase appears to be very small. This difference, however, cannot be corrected, as its precise amount has never been determined, and can be determined only by experiment.

5. Soils are so unequal in density and structure that no two furrows can be cut with precisely the same draft.

6. The rapid vibrations of the index in Fairbank's Dynamometer is a source of more or less error.

But all these sources of error, save the 5th, can be avoided by suitable precautions and instruments, which will be taken and provided at our next plow trial.

LIST OF ENTRIES.

No. 1. "Morrison" Sulky Plow for general purposes.

No. 2. "Morrison" Sulky Plow for old land.

No. 3. Three-Horse Walking Plow, wood beam, 16-inch.

No. 4. Two-Horse Walking Plow, steel beam, 14-inch—Morrison Bros., Fort Madison, Iowa.

No. 5. Gang Plow for old land—B. F. Avery & Sons, Louisville, Ky.

No. 7. "Weir" Sulky Plow for old land.

No. 8. "Weir" Sulky Plow for sod land—Weir Plow Company, Monmouth, Ill.

No. 9. "Slusser" Sulky Attachment and Plow for general purposes.

No. 10. "Slusser" Sulky attachment for any plow—L. Yinger, St. Louis, Mo.

No. 11. "Speer" Walking Plow for general purposes—A. Speer & Son, Pittsburg, Pa.

No. 12. "Carr" Sulky Plow for old land—Marsh Harvester Company, Sycamore, Illinois.

No. 14. "Starling" Sulky Plow for old land.

No. 15. "Starling" Sulky Plow for sod land—Princeton Manufacturing Company, Princeton, Ill.

No. 16. Two-Horse Walking Plow.

No. 17. Two-Horse Walking Plow, wooden land side—Jasper & Grog, Washington, Mo.

No. 18. "Davenport" Sulky Plow for heavy clay land and sod combined.

No. 19. "Davenport" Sulky Plow for light and trashy land—Davenport Plow Company, Davenport, Iowa.

No. 20. "Hughes" Sulky Plow for old land—Hughes' Riding Plow Company, St. Louis, Mo.

No. 21. Two-Horse Walking Plow, short beam—J. M. Tingley, Clifton, Mo.

No. 22. Two-Horse Walking Plow, wood beam—Collins & Co., New York City.

No. 23. Two-Horse Walking Plow, wood beam—Broughton & Adams, Columbia, Mo.

Nos. 24, 25 and 26. Sulky Attachments—Pump & Skein Co., Belleville, Illinois.

No. 27. "Sattley" Sulky Plow for general purposes.

No. 28. Two-Horse Walking Plow, wood beam.

No. 29. Two-Horse Walking Plow, iron beam—Peoria Plow Company, Peoria, Ill.

No. 30. Two-Horse Walking Plow, four changeable bottoms, J. Philips, Smithton, Illinois.

No. 31. "Evans" Sulky Plow for general purposes.

No. 32. "Evans" Sulky Plow for old land.

No. 33. Two Horse Walking Plow, iron beam, 14-inch.

No. 34. Two-Horse Walking Plow, wood beam, 14-inch.

No. 35. Two Horse Walking Plow, wood beam, 12-inch—Moline Plow Company, Kansas City, Mo.

No. 36. "Browne" Sulky Plow for old land.

No. 37. "Browne" Sulky Plow for turf and stubble.

No. 38. "Browne" Sulky Plow for prairie breaker.

No. 39. Two-Horse Walking Plow, iron beam, 14-inch.

No. 40. Two-Horse Walking Plow, wood- beam, 14-inch.

No. 41. Three-Horse Walking Plow, wood beam, 16-inch—B. D. Buford & Co., Rock Island, Ill.

No. 42. "Evans" Sulky Plow for prairie breaker--Moline Plow Company, Kansas City, Mo.

No. 44. Two-Horse Walking Plow—W. Roberts, Rocheport, Mo.

No. 45. "Weir" Sulky Plow for prairie breaking—Davenport Plow Company, Davenport, Iowa.

No. 46. "Davenport" Sulky Plow, prairie breaking—Davenport Plow Company, Davenport, Iowa.

No. 47. "Avery" Sulky Plow for general purposes—B. F. Avery & Sons, Louisville, Ky.

No. 48. Hillside Plow—Lauer & Hartman, Louisville, Ky.

No. 49. Speer's Reversible Plow—A. Speer & Sons, Pittsburg, Penn.

No. 50. "Hughes" Sulky Plow with Sub-soil Attachment—Hughes' Riding Plow Company, St. Louis, Mo.

Some plows present were not entered. One manufacturer, after carefully examining the plows present, said: "I have no use for the Plow Trial." His plows were driven away.

RESULTS OF THE TRIAL.

TABLE 1.—TESTS ON ALL POINTS.

This table gives the average judgment of the Judges on all the points tested, save the draft, which is calculated from table III. In Table I you can compare only those plows under the same head or in the same class, for each class has a standard different from all the others.

Number	Name of Plow and Manufacturer.	Quality of work	Adjustability	Durability	Simplicity	Draft	Total
	Sulky Plows in Bluegrass Sod—Draft Standard 20.						
8	*Weir*, Weir Plow Co., Monmouth, Ill	19	16	15.9	12 1	12.44	75.44
31	*Evans*, Moline Plow Co., Kansas City, Mo	16 6	14.9	14.45	11.85	14.48	71.28
18	*Davenport*, Davenport Plow Co, Davenport, Ia	17 4	15.6	15.9	12.4	16.46	77.76
1	*Morrison*, Morrison Brothers, Ft. Madison, Ia	16	15 4	15.2	12	13.35	71.95
15	*Starling*, Princeton Manufacturing Co., Princeton, Ill	21 2	17 5	16.5	13.2	14.52	82.92
47	*Avery*, B. F. Avery & Sons, Louisville, Ky	13.4	16.5	14.8	12 2	14.18	71.08
27	*Sattley*, Peoria Plow Co., Peoria, Ill	16	13 8	15 2	10.4	13.65	69.05
37	*Browne*, B. D. Buford & Co., Rock Island, Ill	19.6	16.5	16.1	12.10	12 80	77.10
	Prairie Breakers in Bluegrass Sod—Draft Standard 20.						
38	*Browne*, B. D. Buford & Co, Rock Island, Ill	17.8	17	16.8	12.5	13.86	77.96
15	**Starling*, Princeton Manufacturing Co, Princeton, Ill	22	16.7	16 4	12.3	9.72	77.12
42	*Evans*, Moline Plow Co., Kansas City, Mo	21	15.15	14.85	11.85	15.72	78.57
45	*Weir*, Weir Plow Co., Monmouth, Ill	22	16 7	16.4	12.3	....	....
46	*Davenport*, Davenport, Ia	19.6	16 6	16.5	12.8	....	....
	Walking Plows in Bluegrass Sod—Draft Standard 35						
22	*Collins' Walking Plow*, Collins & Co., New York City, N. Y	25.4	....	25.4	....	19.80	70 60
30	**Phillips' Walking Plow*, J. Phillips, Smithton, Ill	24	....	23.6	....	13.69	61.29
11	*Speer Walking Plow*, A. Speer & Son, Pittsburg, Pa	30	....	26	....	20.29	76 29
44	**Roberts' Walking Plow*, W. Roberts, Rocheport, Mo	24.6	....	25.8	....	18.94	69.34

TABLE 1—CONTINUED.

Number	NAME OF PLOW AND MANUFACTURER.	Quality of work	Adjustability	Durability	Simplicity	Draft	Total
	Sulky Plows in Old Bottom Soil—Draft Standard 20.						
12	*Corr*, Marsh Harvester Co., Sycamore, Ill	19.4	17	16.4	12.8	13 03	78.63
1	*Morrison*, Morrison Brothers, Ft. Madison, Ia	20 2	15.4	15.2	12	15 50	78.30
20	*Hughes*, Hughes Plow Co, St. Louis, Mo	21.2	17 8	17 4	13.2	16.81	86.41
47	*Avery*, B. F. Avery & Sons, Louisville, Ky	20.8	16 9	14.8	12.2	13 75	78.45
7	‡*Weir*, Weir Plow Co, Monmouth, Ill	22.44	16.7	16.4	12.3	15 27	83.07
14	*Starling*, Princeton Manufacturing Co, Princeton, Ill	21.6	17.5	16 5	13.2	14.79	83.59
87	*Browne*, B. D. Buford & Co, Rock Island, Ill	21.8	17	16 8	12.5	16.49	84 59
18	*Davenport*, Davenport Plow Co, Davenport, Ia	16 2	16.6	16.5	12 8	16 13	78.23
31	*Evans*, Moline Plow Co., Kansas City, Mo	18.2	15.15	14.85	11 85	11 83	71 88
19	*Davenport*, Davenport Plow Co., Davenport, Ia	21.8	16.6	16 5	12.8	12 62	80 32
27	‡*Sattley*, Peoria Plow Co., Peoria, Ill	20	13.8	15 2	10 6	15.04	74.64
32	*Evans*, Moline Plow Co., Kansas City, Mo	21 2	15.15	14 85	11.85	14.13	77.18
36	*Browne*, B. D. Buford & Co., Rock Island, Ill	22.4	17	16 8	12.5	14 93	83.63
2	*Morrison*, Morrison Brothers, Ft. Madison, Iowa	20.4	15.4	15.2	12	16	79
	Sulky Attachments in Old Bottom Soil—Draft Standard 20						
9	*Slusser*, Sulky Attachment with Plow No. 41	......	......	......	......	18.14	......
9	*Slusser*, L. Yinger, St. Louis, Mo	22	17.6	17 6	12 8	14.29	84 29
	Walking Plows in Old Bottom Soil—Draft Standard 35.						
22	*Collins' Walking Plow*, Collins & Co., New York City, N. Y	28 8	......	25.4	......	30.81	85.01
23	**Broughton & Adams' Walking Plow*, Broughton & Adams, Columbia, Mo	30.6	......	24.6	......	22 58	77.78
41	‡*Buford Walking Plow*, B. D. Buford & Co., Rock Island, Ill	28	......	23 6	......	27 03	78.63
11	‡*Speer Walking Plow*, A. Speer & Son, Pittsburg, Pa	27.8	......	26	......	28.28	82.08
17	*Jasper & Krog Walking Plow*, Jasper & Krog, Washington, Mo	23.8	......	20.2	......	22.05	66.05
16	‡*Jasper & Krog Walking Plow*, Jasper & Krog, Washington, Mo	27 6	......	22	......	21.18	70.78
4	‖*Morrison Walking Plow*, Morrison Brothers, Ft. Madison, Ia	30.6	......	25	......	32.33	87.93

40	*Buford Walking Plow*, B D. Buford & Co., Rock Island, Ill.	31.8	....	24 4	....	32.48	88 68
35	*Moline Walking Plow*, Moline Plow Co., Kansas City, Mo.	31.2	....	22.8	....	30 97	84.97
29	‡*Peoria Walking Plow* Peoria Plow Co., Peoria, Ill.	28 8	....	21.8	....	30.91	81.51
28	*Peoria Walking Plow*, Peoria Plow Co., Peoria, Ill.	30.4	....	20 4	....	30.77	81.57
44	*Roberts' Walking Plow*, W Roberts, Rocheport, Mo.	28.4	....	25 8	....	23.45	77 65
33	*Moline Walking Plow*, Moline Plow Co., Kansas City, Mo.	29	....	22.4	....	26.42	77.82
39	‖*Buford Walking Plow*, B. D. Buford & Co., Rock Island Ill.	30.8	....	23.6	....	33.65	88 05
34	*Moline Walking Plow*, Moline Plow Co., Kansas City, Mo.	31	....	25.5	....	33.73	90.23
	Reversible Plows in Old Bottom Soil—Draft Standard 35.						
48	*Hillside Plow*, Laur & Hartman, Louisville, Ky.	26.2	....	21.4	....	25.50	73.10
	Gang Plows in Old Bottom Soil—Draft Standard 20.						
5	*Gang Plow*, B. F. Avery & Sons, Louisville, Ky.	20.4	17.3	16.4	13.5	14.16	81.76

* This Plow attained the required Depth at one point only.
† This Plow attained the required Depth at no point.
‖ This Plow attained the required Depth at two points only.
‡ This Plow attained the required Depth in one full furrow only.

Remarks on Table I.—Of the eight sulky plows, which successfully completed all the tests in the blue grass sod, the *Starling*, No. 15, obtained the highest average record on all the five points, 82.92; and the *Davenport*, No. 18, the next highest, 77 76.

The *Evans*, No. 42, obtained the highest average record of the *Prairie Breakers*, 78.57; and the *Browne*, No. 38, the next highest, 77.96.

Of the walking Plows in bluegrass sod, the *Speer*, No. 11, has the highest average record, 76.29; and the *Collins*, No. 22, has the next highest 70 60.

Of the 14 Sulky Plows tested in old ground, the *Hughes*, No. 20, secured the highest average record, 86.41; and the *Browne*, No. 37, the next highest, 84.59.

The *Slusser*, the only *Sulky Attachment* tested, secured an average record of 84.29.

Of the 15 Walking Plows tested in old ground, the *Moline*, No. 34, gained the highest general record, 90.23; and the *Buford*, No. 40, the next highest, 88.68.

The *Hillside* and the *Gang Plow* had no competitors, but gained good records and general commendation. The judges make this note: "Having viewed with pleasure *Gang Plow*, No. 5, and its work, we declare the plow and its work admirable.

John Walker, *Chairman.*"

Col. John Walker, Chairman of the Judges, left a note that the "*Morrison Walking Plow*" did the best work; but this plow did not obtain the required depth in the Dynamometer test.

TABLE II.—DYNAMOMETER TESTS.

This table gives the true results of the Dynamometer tests, and the data from which the calculations were made, for all the plows which complied with the regulations established for the government of the trial. These decisions were not made by the judgment of any one. The instruments and the figures must hold the plows and their management responsible for the results obtained.

	Number and Name of Plow.	Width of plow....	Width of furrow.	Depth of furrows.	Draft. in pounds.	Area of section of furrow..........	Draft per square inch of furrow section..........
	Sulky Plows in Bluegrass Soil.						
8	*Weir*, Weir Plow Company, Monmouth, Ill.	16.25	13.65	8.93	783.33	121.89	6.43
38	*Browne*, B. D. Buford & Co., Rock Island, Ill	16.12	14.35	8.56	704.17	122.84	5.73
31	*Evans*, Moline Plow Company, Kansas City, Mo.	15.56	13.79	8.24	675	113.63	5.94
18	*Davenport*, Davenport Plow Company, Davenport, Iowa	14.00	14.73	8.26	591.66	121.67	4.86
1	*Morrison*, Morrison Brothers, Ft. Madison, Iowa.	13.7	11.88	8.25	587.5	98.01	5.99
15	*Starling*, Princeton Manufacturing Company, Princeton, Ill	13.5	12.54	8.32	575	104.33	5.51
47	*Avery*, B. F. Avery & Sons, Louisville, Ky	15.44	15.79	8.22	732.5	129.79	5.64
27	*Sattley*, Peoria Plow Company, Peoria, Ill	16.02	15.18	8.9	791.66	135.10	5.86
37	*Browne*. B. D. Buford & Co., Rock Island, Ill	16.62	13.25	9.41	779.16	124.68	6.25
45	*Weir*, Weir Plow Company, Monmouth, Ill	16.12	14.64	9.2	733.33	134.69	5.44
42	*Evans*, Moline Plow Company, Kansas City, Mo	13.7	13.75	9	733.33	123.75	5.93
	Prairie Breakers in Bluegrass Sod.						
38	*Browne*, B. D. Burford & Co., Rock Island, Ill	16.2	12.97	5.12	383.33	66.41	5.77
38	**Browne*, B. D. Buford & Co.,	16.2	13.39	4.64	420.83	62.13	6.77
42	*Evans*, Moline Plow Company, Kansas City, Mo	13.7	14.29	5.16	375	73.74	5.09
	Walking Plows in Bluegrass Sod.						
	Collins Walking Plow, Collins & Co., New York City, N. Y	13.42	14 45† 14.42	8.4	858.33	121.13	7.09

11	*Speer Walking Plow*, A. Speer & Son, Pittsburg, Pa	9.75	12.66† 10.75	8 68	758.33	87.31	8.63
	Sulky Plows in Old Bottom Soil.						
12	*Corr*, Marsh Harvester Company, Sycamore, Ill	16	14.23	9.75	850	138 46	6.14
1	*Morrison*, Morrison Brothers, Ft. Madison, Iowa	13 7	14 27	9.95	733.33	141 99	5.16
20	*Hughes*, Hughes Plow Company, St. Louis, Mo	15.6	14.47	8.59	591.67	124.30	4.76
47	*Avery*, B. F. Avery & Sons, Louisville, Ky	15 4	16 58	8.29	800	137.45	5.82
14	*Starling*, Princeton Manufacturing Company, Princeton, Ill	15.6	15.4	8.6	716 67	132.44	5.41
37	*Browne*, B. D. Buford & Co., Rock Island, Ill	16 2	15.18	9.11	670.83	138.29	4.85
18	*Davenport*, Davenport Plow Company, Davenport, Iowa	14	14.62	8.67	629.17	126.76	4.96
31	*Evans*, Moline Plow Company, Kansas City, Mo	15.6	12.85	8.97	779 17	115.26	6.76
19	*Davenport*, Davenport Plow Company, Davenport, Iowa	16 4	14.96	8 7	825	130.15	6.34
32	*Evans*, Moline Plow Company, Kansas City, Mo	15 6	15 11	8.38	716.67	126 62	5.66
36	*Browne*, B. D. Buford & Co, Rock Island, Ill	16.2	14.49	8.48	658.33	122.88	5.36
2	*Morrison*, Morrison Brothers, Ft. Madison, Iowa	15.2	12.9	8.46	545.83	109.13	5.00
	Sulky Attachments in Old Bottom Soil.						
9	*Slusser*, L Yinger, St. Louis, Mo	15.3	13.48	8.61	650	116-06	5.60
9	*Slusser Sulky Attachment*, with Plow No. 41	16.4	15.61	8 07	555.55	125.97	4.41
	Walking Plows in Old Bottom Soil.						
22	*Collins Walking Plow*, Collins & Co., New York City, N. Y	13 4	13.93	8.04	508.33	112	4 54
17	*Jasper & Krog Walking Plow*, Jasper & Krog, Washington, Mo	10.4	12 88	8.1	662.5	104.33	6.35‡
40	*Buford Walking Plow*, B. D. Buford & Co., Rock Island, Ill	14.2	13.47	8.11	470.83	109.24	4.31
35	*Moline Walking Plow*, Moline Plow Co., Kansas City, Mo	12.2	13.93† 13 2	8.14	512.5	107.45	4.77‖
28	*Peoria Walking Plow*, Peoria Plow Co., Peoria, Ill	12 2	13.75† 13.2	9.12	570.84	120.38	4.74
44	*Roberts Walking Plow*, W. Roberts, Rocheport, Mo	12.3	11 3	8 58	579.16	96.95	5.97‖
33	*Moline Walking Plow*, Moline Plow Co., Kansas City, Mo	14.1	14·1	8.08	604.16	113.93	5.30
34	*Moline Walking Plow*, Moline Plow Co., Kansas City, Mo	14	14 35	8.75	520.83	125.56	4 15‖

TABLE II—CONTINUED.

NUMBER AND NAME OF PLOW.	Width of Plow...	Width of furrow.	Depth of furrow...	Draft, in pounds	Area of section of furrow..........	Draft per square inch of furrow section........
Reversible Plows in Old Bottom Soil.						
48 *Hillside Plow*, Lauer & Hartman, Louisville, Ky........	9.8	11	8.9	587.5	97.9	5.49
Gang Plow in Old Bottom Soil.						
5 *Gang Plow*, B. F. Avery & Sons, Louisville, Ky........	11.5-11.7	24.75	8.18	1137.5	201.22	5.65

* The driver walked during this test † The width is reduced to the standard, "one inch wider than the plow." ‡ This plow had a land side in part of wood. || Had no cutters.

REMARKS ON TABLE II —Of the first class Sulky Plows tested in blue grass sod, the *Davenport Sulky*, No. 18, shows the lightest draft, 4.86 pounds per square inch of the Furrow Section.* The *Weir Sulky*, No. 45, has the next lightest of this class, 5.44 pounds per square inch of Furrow Section.

Of the Prairie Breakers, the *Evans*, No. 42, has the lightest draft, 5.09 pounds per square inch; and the *Browne Prairie Breaker*, No. 38, the next lowest draft, 5.77 per square inch.

Of the Walking Plows in blue grass sod, *Collins' Walking Plow* has the lightest draft, 7.09 pounds per square inch; and the *Spear Walking Plow*, No. 11, has the next lightest draft, 8.63 pounds per square inch.

Of the Sulky Plows in old ground, the *Hughes Sulky*, No. 20, has the lightest draft, 4 76 pounds per square inch; and the *Browne Sulky*, No. 37, has the next lowest draft, 4.85 pounds per square inch.

Of the Sulky Attachments in old ground, the *Slusser Attachment*, with Plow No. 41, has the lightest draft, 4.41 pounds per square inch.

Of the Walking Plows in old ground, the *Moline Walking Plow*, No. 34, has the lightest draft, 4 15 pounds per square inch; and the *Buford Walking Plow*, No. 40, has the next lightest draft, 4.31 pounds per square inch.

The *Hillside Plow* of Lauer & Hartman, and the *Gang Plows* of B. F. Avery & Co., had no competitors, but both made good records.

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* The *Furrow Section* is a section made across the furrow slice at right angles to its land side.

TABLE III.

The following table, made by Prof. Ficklin from his memoranda taken at the Dynamometer. All the plows tested for draft are included in the Table, and all

SULKY PLOWS IN

NUMBER AND NAME OF PLOW.
No. 8..."*Weir*," Weir Plow Company, Monmouth, Ill
No. 38..."*Browne*," B. D. Buford & Co., Rock Island, Ill
No. 31..."*Evans*," Moline Plow Company, Kansas City, Mo
No. 18..."*Davenport*." Davenport Plow Company, Davenport, Iowa
No. 1..."*Morrison*," Morrison Brothers, Fort Madison, Iowa
No. 15..."*Starling*." Princeton Manufacturing Company, Princeton, Ill
No. 47..."*Avery*,"[‡] B. F. Avery & Sons, Louisville, Ky
No. 27..."*Sattley*," Peoria Plow Company, Peoria, Ill
No. 37..."*Browne*," B. D. Buford & Co., Rock Island, Ill
No. 45..."*Weir*," Weir Plow Company, Monmouth, Ill
No. 42..."*Evans*," Moline Plow Company, Kansas City, Mo

PRAIRIE BREAKARS IN

NUMBER AND NAME OF PLOW.
No. 38..."*Browne*," B. D. Buford & Co., Rock Island, Ill
No. 38...[||]"*Browne*," B. D. Buford & Co., Rock Islane, Ill
No. 15..."*Starling*," Princeton Manufacturing Company. Princeton, Ill
No. 42..."*Evans*," Moline Plow Company, Kansas City, Mo

WALKING PLOWS IN

NUMBER AND NAME OF PLOW.
No. 22..."*Collins Walking Plow*," Collins & Co., New York City, N. Y
No. 30 .."*Phillips Walking Plow*," J. Phillips, Smithton, Ill
No. 11..."*Speer Walking Plow*," A. Speer & Son, Pittsburgh, Pa
No. 44..."*Roberts Walking Plow*," W. Roberts, Rocheport, Mo

[||] This plow was entered here by mistake of driver.

[||] Driver, weighing 195 pounds, walked during this test.

TABLE III.

trial, shows the average results of the six tests made upon each plow with the which did not come up to the regulations are marked with a *.

Blue Grass Sod.

Width of plow......	Width of furrow....	Depth of furrow.....	Velocity per second in feet.............	Draft in pounds......	No. cubic feet of soil moved in minute...	No. cubic feet of soil moved per minute, if the power were 700 pounds..........	No pounds of soil moved per minute, if power were 700...	No. cubic feet of soil moved per minute, if the power were 700 and velocity 3 feet per second.....
16.25	13.65	8.93	2.35	783.33	119.42	106.71	12446 65	136.22
16.12	14.85	8.56	3.48	704.17	175 95	174.91	20401.5	150 78
15.56	18.79	8.24	8.64	675	172.16	178 54	20824.9	147.14
14	14.73	8.26	2.96	591.66	150 22	177.73	20730 43	180 13
13.7	11.88	8.25	2.29	587.5	92.98	110.78	12921.38	145 12
13 5	12.54	8.82	2 58	575	112.18	136 56	15928.36	158.79
15 44	15.79	8.22	3.08	732 5	166.43	159.04	18550.42	154.91
16.2	15.18	8.9	3.08	791.66	173.17	158.12	17859.92	140.14
16.62	13.25	9.41	3.08	779.16	159.78	143.53	16741 84	139.8
16.12	14.64	9.2	3.91	788.33	209.04	199.54	23274 34	153.09
13.7	18.75	9	2.76	783.33	142.24	135.77	15836.21	147.57

Blue Grass Sod.

Width of plow........	Width of furrow....	Depth of furrow.....	Velocity per second in feet...............	Draft in pounds.....	No. cubic feet of soil moved in a minute.	No. cubic feet of soil moved in a minute, if power were 400 pounds.............	No of pounds of soil moved in a minte, with 400 lbs power.	No. cubic feet of soil moved per minute, if the draft were 400 lbs and the velocity 3 feet per second....
16.2	12.97	5 12	3.47	383.33	96.2	100.38	11708.82	86.78
16.2	13.39	4 64	3 33	420 83	86.3	82 08	9567.98	73.9
13.4	†14 75	*3.2	2.75	379.16	52.96	55.87	6516.68	60 95
13.7	14.29	5.16	3.14	375	94.78	101.1	11792.3	96.69

Blue Grass Sod.

Width of plow	Width of furrow....	Depth of furrow......	Velocity per second in feet................	Draft in pounds	No. cubic feet of soil moved per minute.	No. cubic feet of soil moved per minute, if draft were 700 pounds.............	No. pounds of soil moved per minute, if draft were 700 pounds.....	No. cubic feet moved per minute, if the draft were 700 lbs and the velocity 3 feet per second.....
13.42	†14.45	8.4	3.27	858.33	164 91	134.49	15686.91	123.88
12 62	12.2	*7.56	2.96	766.66	118.806	108.91	12120 06	105 31
9.75	†12.66	8.68	2 86	758.38	111.08	102.54	11960.26	107.56
12	11.14	*7.53	2.5	642.5	82.2	89 56	10446.28	118 27

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* Did not reach the standard depth.
† Above the limit in width—one inch more than the width of the plow.

TABLE III—CONTINUED.

NUMBER AND NAME OF PLOW.
SULKY PLOWS IN
No. 12.. "*Corr*," Marsh Harvester Company, Sycamore, Ill
No. 1..."*Morrison*" Morrison Brothers, Fort Madison, Ia
No. 20..."*Hughes*," Hughes Plow Company, St. Louis, Mo
No. 47..."*Avery*," B. F. Avery & Sons, Louisville, Ky
No. 7..."*Weir*," Weir Plow Company, Monmouth, Ill
No. 14..."*Starling*," Princeton Manufacturing Company, Princeton, Ill
No. 37..."*Browne*," B. D. Buford & Co., Rock Island, Ill
No. 18..."*Davenport*," Davenport Plow Company, Davenport, Ia
No. 31..."*Evans*," Moline Plow Company, Kansas City, Mo
No. 19..."*Davenport*," Davenport Plow Company, Davenport, Ia
No. 27..."*Sattley*," Peoria, Plow Company, Peoria, Ill
No. 32..."*Evans*," Moline Plow Company, Kansas City, Mo
No. 36..."*Browne*," B. D. Buford & Co., Rock Island, Ill
No. 2..."*Morrison*," Morrison Brothers, Fort Madison, Ia
SULKY ATTACHMENTS IN
No. 9..."*Slusser Sulky Attachment*," with Plow No. 41
No. 10..."*Slusser*," L. Yinger, St. Louis, Mo
WALKING PLOWS IN
No. 22..."*Collins Walking Plow*," Collins & Co., New York City, N. Y
No. 23..."*Broughton & Adams Walking Plow*," Broughton & Adams, Columbia, Mo...
No. 41..."*Buford Walking Plow*," B. D. Buford & Co., Rock Island, Ill
No. 11..."*Speer Walking Plow*," Speer & Son, Pittsburgh, Pa
No. 17..."*Jasper & Krog Walking Plow*," Jasper & Krog, Washington, Mo
No. 16..."*Jasper & Krog Walking Plow*," Jasper & Krog, Washington, Mo
No. 4..."*Morrison Walking Plow*," Morrison Brothers, Fort Madison, Ia
No. 40..."*Buford Walking Plow*," B. D. Buford & Co., Rock Island, Ill
No. 35..."*Moline Walking Plow*," Moline Plow Company, Kansas City, Mo
No. 29..."*Peoria Walking Plow*," Peoria Plow Company, Peoria, Ill
No. 28..."*Peoria Walking Plow*," Peoria Plow Company, Peoria, Ill
No. 44..."*Roberts Walking Plow*," W. Roberts, Rocheport, Mo
No. 33..."*Moline Walking Plow*," Moline Plow Company, Kansas City, Mo
No. 39..."*Buford Walking Plow*," B. D. Buford & Co., Rock Island, Ill
No. 34..."*Moline Walking Plow*," Moline Plow Company, Kansas City, Mo
REVERSIBLE PLOWS IN
No. 48..."*Hillside Plow*," Lauer & Hartman, Louisville, Ky
GANG PLOW IN
No. 5..."*Gang Plow*," B. F. Avery & Sons, Louisville, Ky

TABLE III—CONTINUED.

OLD BOTTOM SOIL.

Width of plow in inches...........	Average width of furrow............	Average depth of furrow............	Velocity per second expressed in feet....	Average power expressed in pounds..	No. of cubic feet of soil moved in a minute............	No. cubic feet of soil moved per minute, if draft were 700 lbs.	No. pounds of soil moved per minute if draft were 700 lbs	No. cubic feet moved per minute, if the draft were 700 lbs and the velocity 3 feet per second.....
16	14.23	9.73	2.1	850	121.42	100	12574	142.86
13.7	14.27	9.95	4.1	733.33	242.64	231.61	29122.64	169.47
15 6	14.47	8.59	2 35	591.67	121.84	144.65	18188.29	184.66
15.4	†16.58	8.29	3.48	800	197 08	172.44	21682.6	148.65
15.7	16.5	*7.9	2.57	662.5	140.16	147.97	18605.75	172.73
15.6	15.4	8.6	4	716.67	220.73	215.59	27108.29	161.69
16.2	15.18	9.11	3.81	670.83	219.57	229.13	28810.81	180.42
14	14.62	8.67	3.2	629.17	168.9	187.91	23627.8	177.28
15.5	12.85	8.97	3.81	779.17	182.86	151.45	19043.32	119.25
16.4	14 96	8.7	3,33	825	180.76	153.37	19284.74	138.17
16.2	15.36	*7.95	3.63	650	185.01	199.24	15052.44	164.66
15.6	15.11	8.38	4	716.67	211.02	206.11	25916.27	154.58
16.2	14.49	8.48	4.21	658.33	215.49	229.13	28810.81	163.27
15.2	12.9	8.46	3.08	545.83	138.4	177.49	22317.59	172.88

OLD BOTTOM SOIL.

16.4	15.61	8.07	2.85	555.55	149.82	188.77	23735.94	198.7
15.3	13.48	8.61	2.86	650	138.18	148.81	18711.37	191.06

OLD BOTTOM SOIL.

13.4	13 93	8 04	2.04	508.33	95.69	131.77	16568.66	193.78
11.6	†13.73	*7.95	3.07	600	139 93	163 25	20527.05	159.53
16.4	14.83	*7.81	3.08	591.67	148.52	175.71	22073.77	171.15
9.8	†12.81	*7.77	2.22	408.33	77.67	133.15	16742.28	179.93
10.4	†12.88	8.1	3.33	662.5	128 2	135.45	17031.48	122.03
10.9	†14 11	*7 75	2.38	550	91.77	116.79	14685.17	147.21
14.3	15 22	*7.37	3.07	437.5	143.72	229.95	28913 91	224.71
14 2	13.47	8.11	2.76	470.83	125.57	186.69	23474.4	202.92
12.2	†13.93	8.14	3.8	512.5	170.54	232.98	29288.62	183.89
12.7	†16.71	*7.95	3.02	508.33	137	188 66	23722.11	187.38
12 2	†13.75	9 12	3	570.84	148.62	182.24	22914 86	182 24
12.3	11.3	8.58	2 85	579.16	114.85	138.81	17453.99	146.12
14.1	14.1	8.08	3.33	604.16	151.28	175 28	22039.71	157.91
14.2	†16 03	*7,81	3.33	500	164.87	230.82	29023.31	207.64
14	14.35	8.75	3.4	520.83	177.54	238.61	30002.82	210.54

OLD BOTTOM SOIL.

9 8	†11	8.9	3 4	537.5	139.3	181.41	22810.49	160.07

OLD BOTTOM SOIL.

11.6—11.7	24.75	8.13	2 22	1137.5	186 26	114.62	14412.32	154.89

*Did not reach the standard depth.

‡Above the limit in width—"one inch more than the width of the plow."

REMARKS ON TABLE III—This is an important table. It gives all the important memoranda made at the Dynamometer trial, and many very valuable deductions made therefrom by Prof. Ficklin. From the data here given, one can easily determine what each plow can do in any given time. He can tell how much land each plow can break in a day, and how many tons and cubic feet of soil can be moved, and at what expenditure of force.

In this table the last column best shows the comparative merits of the plows in this test, as in it the speed and power is reduced to the same standard.

Of the 11 Sulky Plows tested in bluegrass sod, the "Davenport Sulky," No. 18, moved the most sod, 180 13 cubic feet per minute; and the "Starling Sulky," No. 15, came next, moving 158.79 cubic feet per minute.

Of the prairie breakers, the "Evans," moved the most soil, 96.59 cubic feet per minute; and the "Brown," No. 38, came next, and moved 86.78 cubic feet per minute.

Of the Walking Plows, in bluegrass sod, the "Collins Walking Plow was first, moving 123.38 cubic feet per minute, and the *Roberts Walking Plow* moved 118.27 cubic feet per minute. In old ground *Hughes Sulky Plow* moved 184.66 cubic feet per minute, 4.24 cubic feet more than any other sulky plow in old ground: and the *Browne Sulky* came next and moved 180.42 cubic feet.

The *Slusser Sulky Attachment*, with plow No. 41, moved 198.7 cubic feet per minute. This is 27.55 cubic feet more than No. 41 moved when run as a walking plow.

Of the 15 walking plows tested in old ground, the *Morrison Walking Plow* moved the most soil, 224.71 cubic feet per minute; and the *Moline Walking Plow*, No. 34, moved 210.54 per minute, and stands second.

The Reversible Plow and the Gang Plow had no competitors.

TABLE IV.—PLOWS WHICH FAILED TO REACH THE REQUIRED DEPTH.

No.	Name of Plow and Manufacturer.	Width of plow.	Width of furrow.	Width corrected.	Depth of furrow.	Depth corrected.	Draft.	Area of furrow section.	Pounds per sq. inch.
	WALKING PLOWS IN BLUEGRASS SOD.								
30	*Phillip's Walking Plow*, J. Phillips, Smithton, Ill......	12.62	12.2	11.5	*7.56	8.5	1000	97.75	10.23
44	*Roberts' Walking Plow*, W. Roberts, Rocheport, Mo...	12	11.14	13.12	*7.53	8.25	800	108.24	7.39
	PRAIRIE BREAKERS IN BLUEGRASS SOD.								
15	*Starling*, Princeton Manufacturing Company, Ill.......	13 4	14.5	14.4	†3.2	....	379.16	46.08	8.23
	SULKY PLOWS IN OLD BOTTOM LAND.								
7	*Weir Sulky*, Wier Plow Company, Monmouth, Ill......	15 7	16.5	16.3	‡7 9	8.1	692	132.03	5.24
27	*Sattley Sulky*, Peoria Plow Company, Peoria, Ill.......	16.2	15.36	13 33	‡7.95	8.11	575	108.11	5.32
	WALKING PLOWS IN OLD BOTTOM SOIL.								
23	*Broughton & Adams' Walking Plow*, Columbia, Mo.....	11.6	13.73	12.6	*7.95	8	625	100.8	§6.20
41	*Buford Walking Plow*, Buford & Co., Rock Island, Ill..	16 4	....	14.7	‡7.8	8.1	617	119.07	§5.18
11	*Speer Walking Plow*, A. Speer & Son, Pittsburg, Pa...	9.8	12.81	10 8	‡7.77	8.1	433	87.48	§4 95
16	*Jasper & Croog Walk. Plow*, Jasper & Croog, Was't'n, Mo	10.9	....	11.66	‡7.75	8	617	93.28	§6.61
4	*Morrison Walk. Plow*, (st'l b'm) M. & Bros., Ft. Mad., Ia	14.3	15.22	13.7	‖7.37	8.2	487	112.34	4.34
29	*Peoria Walking Plow*, Peoria Plow Co., Peoria, Ill.....	12.7	14.4	13 7	‡7.95	9.4	583	128.78	4.53
39	*Buford Walking Plow*, B. D. Buford & Co., Ill..........	14.2	16	15.2	‖7.81	8.1	512	123.12	4.16

* This plow made the required depth at only one of the last six points, and from the data at that point draft is calculated. † This plow secured the depth at no point, and the results are calculated on the depths obtained. ‡ This Plow obtained the depth in one furrow, three points only, and from these three the results were calculated. ‖ This Plow obtained the depth required, at two points only, and from these two the results were calculated. § Had no cutters.

Remarks on Table iv. The *Buford Walking Plow*, No. 39, has the lowest draft (4.16) in this table, and the *Morrison Walking Plow*, No. 4, has the next lowest draft (4.34); but the *Moline Walking Plow*, No 34, secured a still lower draft (4.15) with the great depth of 8.75 inches.

It has been determined by numerous experiments in Europe and America, that the draft in plowing increases about 10 per cent. for every inch of increase in depth between 4 and twelve inches. If, therefore, we make this correction making 8 inches, the required depth, the standard, we shall have the draft as follows for these three plows of lightest draft in this class.

No. 34. Moline Walking Plow, 3.86 lbs. per square inch of furrow section. No. 39. Buford Walking plow, 4.12 lbs. per square inch of furrow section. No. 4. Morrison Walking Plow, 4.25 lbs. per square inch of furrow section.

OTHER PLOW TRIALS.

That we may compare the draft in this plow trial with the draft in other trials, we quote the following:

PLOW TRIAL AT OTTAWA, ILL., APRIL 13, 1877.

PLOWS.	Draft..........	Depth..........	Width..........	Area of furrow section..........	Pounds draft per square inch of furrow section.
Millbrook Plow..........................	507 2-7	7 5-7	15 2-7	117.89	4.30
Buford Plow..........................	500	7	15 5-7	110.	4.55
Davenport Plow..........................	492 6-7	6 17-28	16 3-7	108.60	4.54
Avery Plow..........................	425	7 1-14	15 1-2	109.59	3.88
Canton Plow..........................	456 1-7	7	14 9-14	102.48	4.45

PLOW TRIAL AT LAFAYETTE, INDIANA, JUNE 27, 1876.

PLOWS.	Draft..........	Depth..........	Width..........	Area of furrow section..........	Pounds draft per square inch of furrow section.
Deer & Co., Moline, Ill..............	No report.	No report.	No report.	126.28	4.07
Moline Plow Co., Ill..................				151.06	4.05
Davenport Plow Co., Iowa..........				137.25	3.80
B. D. Buford, Rock Island, Ill.....				126.28	5.40

In these trials we can compare the draft only. In the Ottawa trial, no plow had so light a draft as some of ours. At the Lafayette trial the Davenport plow alone had a draft as low as some in our trial, but whether it would be as low when reduced to our standard of depth, we have no data to determine, as the depth was not given. But it is very probable the furrows were not so deep as in our trial; for so great a depth is not usual, and besides, the same plow was in our trial, and did not reach so light a draft.

THE GREENBRUSH PLOW TRIAL.

Held at Greenbrush, N. Y., June 4th, 1850, under the auspices of the New York State Agricultural Society. It probably drew together more plows than any other purely plow trial prior to our own. Some forty entries were made at this trial, as stated by the committee.

Of the plows tested for draft, the report gives us the data for comparing a part only. But some of these showed the lowest draft. The two following are the lowest on the list:

PLOWS.	Depth of furrow..	Width of furrow.	Draft in pounds...	Draft per square inch of furrow section..........	Corrected for eight inches in depth.........
Iron Beam Plow......................	7	12	410	4.88	5.37
Schodack Plow........................	6	12	340	4.72	5.66

Which shows that several of our plows had a lighter draft.

THE NATIONAL PLOW TRIAL AT UTICA, N. Y.

Under the auspices of the New York State Agricultural Society, was held on September 10, 1867, and was doubtless the most thorough and useful of all previous plow trials. The report of it is a most valuable contribution to the literature of plows and plowing. There were only 14 entries, and 6 of these by one firm. The Holbrook and Collins plows were the leading contestants at the trial for draft, and their records were as follows:

PLOWS.	Depth of furrow.	Width of furrow.	Draft in pounds...	Draft per square inch of furrow section..........	Corrected in a depth of eight inches.........
Holbrook Plow, in sod............	7	10	472	6.74	7.41
Holbrook Plow, in stubble......	6	10	328	5.47	6.56
Collins Plow, in stubble*.........	7	13	403	4.43	4.87

It will appear from this table that some eight plows at our trial showed a lighter draft than these Champion plows of the Eastern States.

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* At this trial, the premium was given to the "Holbrook" Plow, after many trials. In this table, we select the best records made by both plows.

FOREIGN PLOW TRIALS.

In comparing foreign plows, there will be no necessity to compare but two: the *Howard's Champion Plow*, manufactured at Bedford, England, and *Ransome's Prize Plow*, manufactured at Ipswich, England; for these plows surpass all other British plows, and are superior to the Continental plows. These plows came into competition at the plow trial at Hertfordshire, in October 4, 1854, and made the following records:

PLOWS.	Width of share...	Width of furrow.	Depth of furrow.	Average draft in five trials — in pounds..........	Area of section of the furrow in square inches...	Pounds of draft per square inch of furrow section..........
Howard's Champion Plow......	7.25	9.50	8 inch	380.8	76	5.01
Ransome's Prize Plow............	7	9	8 inch	459.2	72	6.4

The premium was awarded to Howard's Champion Plow for the *Lightest Draft*, and as "*the best plow for general purposes.*" Howard's Champion Plows also gained prize medals at two National Expositions, at London in 1851, and at Paris in 1854. This plow has, in fact, taken the prize at some twenty competitive exhibitions, both in Great Britain and on the Continent of Europe.

After many trials with all competitors for light draft, "Howard's Champion" has surpassed all the plows of Great Britain, adapted to common soils, but the *Turn-wrist Plow* of Kent, made very sharp and long, for adhesive clay, has a lighter draft in the waxy clay soils of South England.

The Busey Plow showed less draft than the Howard at the trial of the London Exposition, but the report does not give data for comparison with our plows; still, the small difference between it and the Howard will show its draft greater than our plows. But later trials place Howard's Champion Plow at the head of European plows, for light draft and good work in common soils.

It was stated in the *London News* that the Busey plow took the premium at the London Exposition, but two plows, one Belgian and the other American, showed lighter draft than the Busey.

It thus appears that the plows at our trial excel, in lightness of draft, all the plows tested either in America or Europe of which we can find any record for comparison.

Ransome's Prize Plow is a great favorite in Great Britain, and has won many prizes at home and on the Continent, but is admitted to be inferior to Howard's Champion Plow in draft, as proved at many contests, and as shown in the preceding table. But several of the plows at our great trial, as No. 18, the *Davenport Sulky*, in sod 4.86 pounds to the square inch; No. 20, *Hughes' Sulky*, 4.76 in old ground; No. 37, *Browne Sulky*, 4.85; No. 18, *Davenport Sulky*, 4.96; No. 22, *Collins Walking*, 4.54; No. 40, *Buford Walking*, 4.31; No. 35, *Moline Walking*, 4.77; No. 28, *Peoria Walking*, 4.74; No. 34, *Moline Walking*, 4.15; all made better records on draft than the *Howard's Champion*, 5.01; although the latter had shown a lighter draft in the common soil than any of its European competitors. Howard's Champion is a graceful plow, with taper pointed share, and long, narrow, graduated mold-board, made with special reference to light draft, whereas our breaking plows have shorter mold-boards, with the design of pulverizing the soil more thoroughly.

At the great plow trial at the London Exposition in 1851, only twenty-six plows were entered, and only eleven were tested on the draft; and besides, the soil was uneven and of unequal hardness, rendering the test unsatisfactory. A Belgian plow showed the lightest draft, 5.27, and an American plow (Hall & Spears,) came next, at 5.30. The attendance at this trial was very small.

At the plow trial at the Paris Exposition, on June 7, 1855, forty plows were entered and fifteen were tested for draft. Of these the Howard's Champion showed the lightest draft. No American plow was in this competition. This trial attracted but little attention. Not over two hundred persons were on the ground at any one time.

SOME OUTSIDE TESTS ON DRAFTS.

The sulky plow No. 15, of the Princeton Manufacturing Company, was tested to determine the draft, when the plow was free from the soil and the driver weighed 165 pounds. The average of numerous tests gave a draft of 22.91 pounds.

The sulky plow No 38, was tested to show the difference of draft when the driver rode and when he walked. When the driver, who weighed 195 pounds, was riding, the draft was 5.77 pounds per square inch of the furrow section, and when he was walking, the draft was 6.77 pounds per square inch of the furrow section. These tests were made on adjoining furrows, and show a draft of one pound per square inch less when the driver rode. Does this difference show the amount of draft transferred from the traces to the reins?

The Hughes sulky No 50, was tested with the sub-soil attachment in old ground, and the committee of judges made the following report of the results:

> "We witnessed a field trial of Hughes sulky plow, with the sub-soil attachment, and esteem it a first class implement, and confidently recommend it to our farmers.
>
> JOHN WALKER, Chairman."

CULTIVATOR TRIAL.

On the Monday succeeding the plow trial, May 21st, there was an interesting *trial of cultivators* in the bottom cornfield on the Agricultural Farm. An interested and approving concourse of farmers was present. The trial was pleasant and satisfactory to all.

The ground was in good order and the corn just high enough for the first working.

Jesse A. Boulton, James Boggs and Joel H. Hayden were selected as judges.

CULTIVATORS ENTERED.

No. 1, *Western Cultivator*, Moline Plow Co., Moline, Ill. This is two-horse tongued Walking Cultivator with iron beams.

No. 2, *New Era*, is the same as No. 1, without a tongue.

No. 4. *New Era*, (with iron beams).

No. 5. *Combined Riding and Walking*, Buford & Co.

No. 6. *Defiance Walking Cultivator*, Buford & Co.

This instrument is made with iron or wood beams.

No. 7. *Bulldozer* (a tonuegless walking cultivator), Buford & Co., R. I., Illinois.

No. 9. *Blackhawk* (a double tongued walking cultivator), Buford & Co.

No. 10. *Thomas Smoothing Harrow*, entered by Mr. R. B. Maddox.

No. 11. *Double Diamond Cultivator*,* W. Roberts, Rocheport, Mo.

No. 12. *Hughes Cultivating Harrow*,† Hughes' Plow Company, St. Louis, Mo.

The judges and competitors made a most thorough and exhaustive trial of the various cultivators. The following table is compiled from their cards and notes:

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*This harrow was not tested at the trial, but did good work afterwards.

†This cultivator was not tried as there was no one present to represent it on the day of trial. It did good work on the Saturday before.

RESULTS OF CULTIVATOR TRIAL.

NAME AND NUMBER.	Qualities.	Boulton	Boggs	Hayden	Average
1—*Western*	Work	32	20	20	24
	Adjustability	33	24	20	25.7
	Simplicity	28	20	20	22.7
	Total	93	64	60	72.4
2—*New Era*	Work	33	25	20	26
	Adjustability	33	18	20	23.7
	Simplicity	29	16	20	21.7
	Total	95	59	60	71.4
5—*Combined*	Work	35	32	35	34
	Adjustibility	34	30	30	31.3
	Simplicity	29	25	25	26.3
	Total	98	87	90	91.6
6—*Defiance*	Work	33	30	25	29.3
	Adjustability	32	22	20	24.7
	Simplicity	27	21	20	22.7
	Total	92	73	65	76.7
7—*Bulldozer*	Work	34	30	25	29.7
	Adjustability	32	25	20	25.7
	Simplicity	28	15	20	21
	Total	94	70	65	76.4

It will be seen from this table that *Buford Combined Walking and Riding Cultivator* received the highest marks on all the points considered.

The judges left the following memoranda:

"We, the committee, find the *Riding Cultivator* of B. D. Buford & Co., an extra farm implement.
JESSE A. BOULTON, Chairman."

"The committee esteem the *Blackhawk* an extra farm implement.
JESSE A. BOULTON, Chairman."

"For the cultivation of young corn, we deem the *Thomas Smoothing Harrow* without a rival.
JESSE A. BOULTON, Chairman."

The one-horse cultivator of Mr. W. Roberts was on the ground, but not entered in this trial for some reason unknown to the committee, but from subsequent trial it has been proved an excellent instrument.

Your committee cannot refrain from expressing the opinion that the results of this plow trial will prove vastly useful to the people of our State by inducing our farmers to use better instruments, and do better and more plowing and cultivating.

We have labored earnestly and carefully to have the trial fair and useful, and to report the results with absolute accuracy and impartiality.

With renewed expressions of gratitude to those who have assisted in the work assigned us, we respectfully submit the results of your plow trial.

G. C. SWALLOW, Dean of Agricultural College.
J. P. McAFEE, Master of Boone Grange.
W. L. VICTOR,
W. T. HICKMAN, } From Boone Grange.
S. B. SPENCE,
J. G. POTTS,
J. I. STERNE, } From the Boone County Agricultural and Mechanical Association.
J. C. GILLASPY,
Committee of Arrangements.

S. M. TRACY, Assistant Prof. Ag., Secretary.

Plow Trial Appendix.

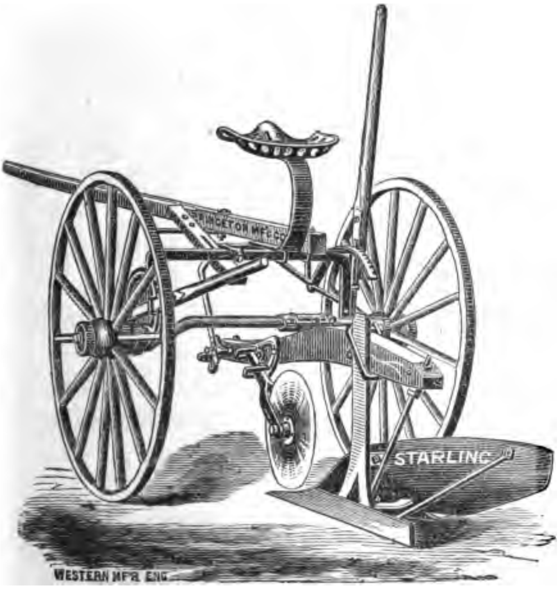
A.

We have deemed it but fair to give those engaged in this Plow Trial an opportunity to represent their own plows, and present, in their own way, what they consider the good qualities and adaptations of each. This will enable the manufacturer to protect his own interests, and the farmer to compare the results of the trial with the efforts of the manufacturer to furnish him with an instrument best adapted to meet his wants, and do his work in the best manner at the least possible expense. These cuts have been furnished without cost, and their use greatly aids in comparing the different implements, so as to form a sensible idea of them. The University is not responsible for the representations of the plows, but only for the effort to bring the farmer and manufacturer together for business. The practical value of the Plow Trial will arise not only from improving the manufactured article, but also from bringing into use these improved implements. It is the object of the Agricultural College to utilize knowledge.

PLOWS.

The following cuts and descriptions give the reader a good idea of structure and adaptations of the plows represented at the great trial:

STARLING SULKY PLOW FOR SOD GROUND.

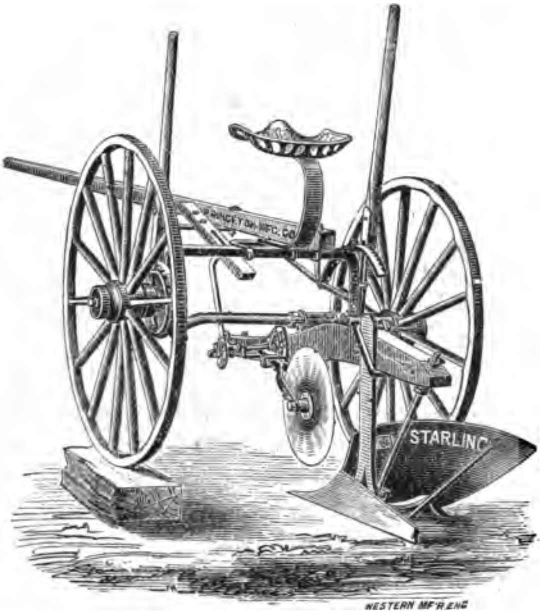


This plow was entered as No. 15 by *The Princeton Manufacturing Co., Princeton, Ill.*

It came into the competition both as a "Sod Plow" and as a "Prairie Breaker," and its record can be seen in the foregoing report.

This plow is made in that shape which careful experiment has shown to be best for turning the sod just as it should be, at the least expenditure of power.

STARLING SULKY PLOW FOR OLD GROUND.



This was entered as No. 14, by *The Princeton Manufacturing Company*, *Princeton*, *Ills.*

It was tested in the old ground and its record may be seen in the above report.

These plows are made of the best material, and in the best manner.

The frame is made of wrought iron, and is therefore light, strong and durable.

The wheels are forty-four inches high, thus insuring ease of draft and uniformity of motion over rough ground.

The wheels have drilled pipe boxes 8 inches long, from which dirt is excluded.

The axles are wrought iron, and are turned to fit the boxes.

The mold board and share are made of patent cast steel, with *solid steel land side.*

The horses are hitched directly to the end of the plow beam, and are made to raise the plow out of the ground, when turning at the ends.

The depth of the furrow is regulated by the lever at the right-hand side, which locks the plow firmly at any desired depth, and which can also be used to raise the plow out of the ground.

The lever at the left-hand side levels the plow for first furrow or on side hills.

Both levers can be operated without stopping the team or leaving the seat.

A full depth furrow can be plowed from the start, and square corners can be turned to right or left, and as quick as with a walking plow.

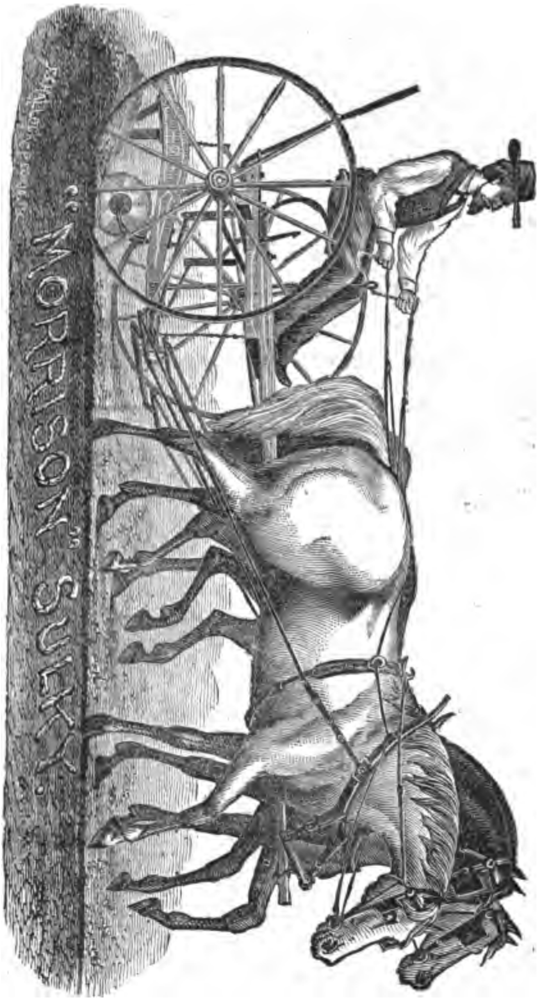
The plowman can ride or walk, and do equally good work.

The coulter is 16 inches diameter, cast steel, attached to the beam by a patent vibrating frame, and readily adjustable for any required depth. It is provided with a patent device by which dirt is effectually excluded from the bearings, and the oil retained.

The coulter frame is so secured to the beam that in passing obstructions, such as stones, roots, etc., which cannot be cut, the coulter will rise and avoid all chance of breakage.

A three-horse evener, single trees and neck yoke is furnished with each plow.

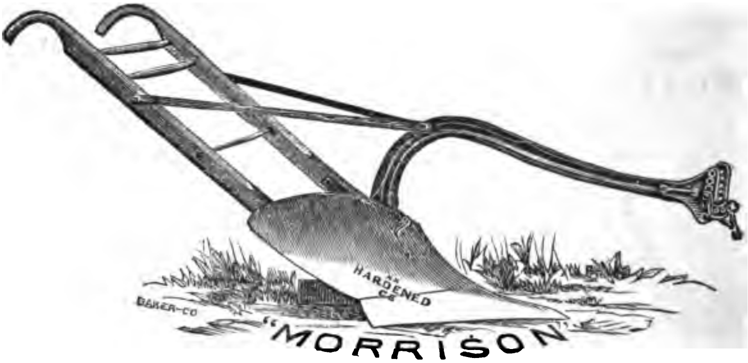
THE MORRISON SULKY PLOW.


"MORRISON'S SULKY."

This plow, patented March 20, 1877, by H. H. Canady, was entered as No. 1, by *Morrison Bros., Fort Madison, Iowa*, and was tested both in the sod and old ground. This plow is constructed on different principles from all the others, as it hangs loose in the frame. The plow adjusts itself to the unevenness of the ground, and runs level whether the land wheel is high or low, and the lightness of its draft proves that nothing is gained by the theory of carrying the plow on the wheels. This plow does excellent work in both sod and old ground. It is very simplo in construction, and any part of the frame may be made or repaired at a country shop. The wheels are four feet six inches high—making the carriage easy to ride on—the plow can be taken apart in two minutes, to store it away. The plow is raised out at the end by the driver's foot, thus leaving the hands free to guide the team. It can be sold to the farmer for less money than more complicated instruments.

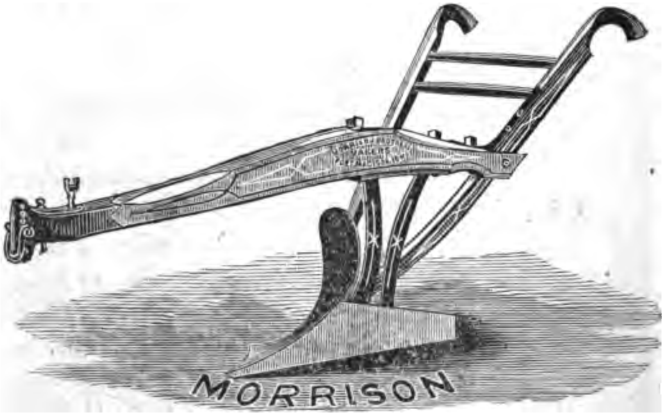
McAllister & Bowling, Agents, Columbia, Mo.

THE MORRISON STEEL BEAM WALKING PLOW.



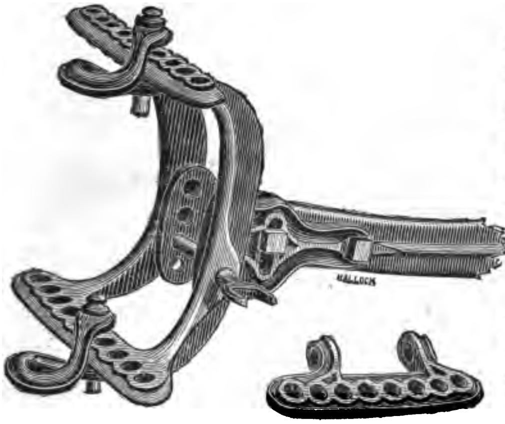
This plow is a beauty in shape and finish, and is thoroughly hardened in all its wearing parts. The beam is of fine steel, rolled in "T" shape, and is superior to the iron beam in strength, and weighs twelve pounds less. It runs alone with great stability and regularity, and is very popular in Boone and other parts of Missouri, where hundreds are now in use. It was entered as No. 4, and its record will be found in the Report.

MORRISON WOOD BEAM (Three-Horse) WALKING PLOW.



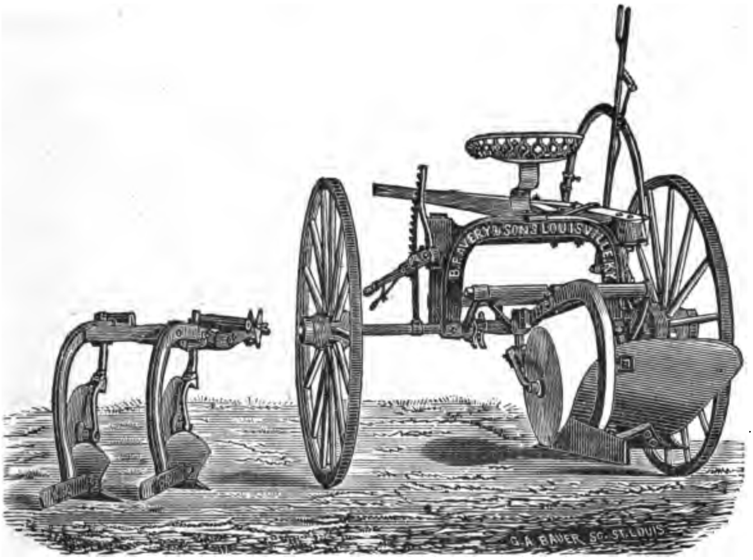
This was entered as No. 3, but was delayed and did not enter the trial. It has since been tested by the Farm Superintendent, who reports favorably. We claim the greatest durability, light draft and good work. It runs alone, and will do all any three-horse sulky will, except carry the driver.

MORRISON'S THREE-HORSE EQUALIZING CLEVIS.



This clevis is so arranged that the two outside horses work on a doubletree 4½ feet long, thus leaving space in the center for the middle horse, whose singletree is attached to the upper end of equalizer, thus equalizing the draft and keeping the traces separate. To plow with two horses, remove the equalizer and substitute the clevis shown in cut.

AVERY 16-INCH SULKY PLOW FOR OLD GROUND.


B.F. AVERY & SONS LOUISVILLE KY.
G.A. BAUER SC. ST. LOUIS

This cut represents the *Combined Sulky and Gang Plow*, entered by *B. F. Avery & Sons*, *Louisville*, *Ky.*, as Nos. 5 and 47. The record made by this plow may be found in the above report.

Our Sulky Plow, as now before the public, is the result of years of study and practical experiment, and we are confident, embraces all the requirements of a perfect riding plow. In its construction we have aimed at *simplicity*, *strength*, *perfection in its working capacity*, and *especially ease of draft;* and as an indication of our success in this direction, we need only say, our plow, wherever tested, either alone or in competition, has received the very highest praise.

POINTS OF EXCELLENCE.

1. It is light draft. (By repeated tests being by far the lightest draft Sulky Plow now in use.)
2. It is simple in construction.
3. There is no weight on the horses' necks.
4. The plow is raised out of the ground by a wheel-ratchet, requiring no effort whatever of the plowman.
5. The sulky is made to run level when one wheel is in the furrow, by a "wing-lever," at the control of the driver.
6. It is a *Combined* Sulky and Gang Plow, a most important feature to every farmer. The Single Plow can be removed and the Gang attached in its place in from *three to five minutes.*
7. We warrant it to completely cover weeds and trash and scour perfectly in all kinds of soil.
8. It has Caster Rolling Coulter, with adjustable couplings of new design.
9. The Plow is made of the finest steel, the beam of wrought iron, and the Sulky-bed is light and tasteful in appearance and highly decorated.

The capacity of our works is 160,000 plows annually. Within a few weeks we will have completed extensive additions and enlargements, enabling us to turn out 200,000 plows. Our foreign trade has made this enlargement necessary. To Odessa (Russia) alone we are now completing the shipment of a recent order for 10,000 plows; large orders also from Birmingham, Berlin and Paris.

Our capital employed is about two millions; hands employed, about five hundred.

Respectfully,

B. F. Avery & Sons.

DAVENPORT SULKY PLOW FOR SOD AND CLAYEY SOIL.

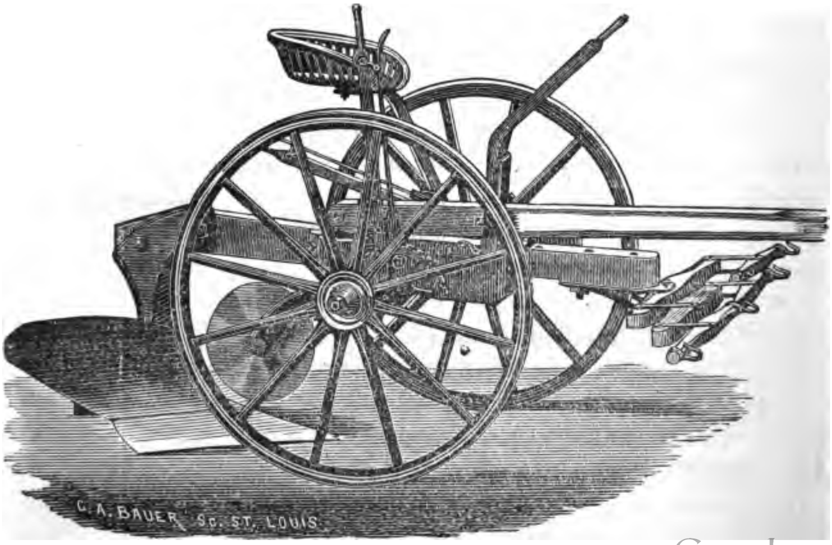
This plow was entered as No. 18 by the *Davenport Plow Company, Davenport, Iowa.* Its record may be seen in the foregoing report.

DAVENPORT SULKY PLOW FOR LIGHT SOIL.

The Davenport Sulky Plow has gained a most enviable reputation amongst the dealers, and on account of its simplicity of construction and ease of handling, is giving unparalleled satisfaction. The adjustability of this machine is so perfect that one who is able to hitch and drive a three-horse team cannot fail to operate it. It is adjusted without the use of thumb screws, pins or braces, which are so liable to give way and render the machine, on account of a 10-cent thumb screw, entirely worthless. This machine is adjusted simply by two levers on one side and a continuous thribble crank axle, the plow being attached to the middle crank by hounds to secure it against lateral motion. The inside lever is attached firmly to the axle, upon which the plow is pivoted. This inside lever controls the movement of the plow, and at the same motion adjusts the left hand wheel. One movement of this lever pressing it back as the team is moving, puts the plow into the ground, and is locked by placing the catch on the lever in the notch of the ratchet. This same one motion which engages the plow, adjusts the left hand wheel by raising it six inches on the unplowed ground, and thus the frame is square and the wheels running free upon the axles. The plow is thrown out of the ground by disengaging this same lever from the ratchet and pressing it forward, which is done at one motion. This same motion lowers the left hand wheel to the same plane of the right, which squares the frame ready to move off or turn round. The frame being thus square is relieved from that cramped position in turning which is so fatal to hubs. One motion of this inside lever puts the plow in the ground and locks it and adjusts the frame perfectly. One motion with this same lever takes the plow out of the ground, elevates it ready to turn round, with frame perfectly adjusted. The operator is thus relieved of the necessity of adjusting at every corner the left hand wheel, by changing lines from one hand to the other, and scuffling with a left hand lever, which is fixed on the left side for that purpose. The outside lever is used only in backing furrow and in finishing dead furrow, and serves to hold the right hand wheel in position down in the furrow by placing the lever in the forward notch. The draft on the Davenport is light on account of its central pivotal connections, transferring the weight of the plow and furrow from the drag principle to the wheels. There cannot be any side draft, from the fact that the team is hitched directly to the point of the beam. The Davenport is very durable on account of its simplicity, being made out of very few pieces, all of which are iron and firmly put together. The plow is made of the very finest quality of steel, with mould elegantly turned for general use. This plow in its class was accorded the honors for light draft in the grand field trial at Lafayette, Ind., June last, and for its superior qualities was awarded the first premium at the great St. Louis fair, in October, 1876, and in the great field trial held under the auspices of the State Agricultural College, at Columbia, Mo., May 16, 17, 18 and 19. This last was the most thorough and impartial test ever made in this country in competition with all leading sulkies of the age.

This plow, entered as No. 19, by the *Davenport Plow Co.*, is simila to No. 18, but has special adaptations to light soil.

CORRR SULKY PLOW IN OLD GROUND.


C. A. BAUER Sc. ST. LOUIS

This sulky was entered as No. 12, and its record will be found in the report.

This Sulky benefits the Land—As the 16-inch plow it employs will not only run deep and turn the soil completely over, but cut the stalks and turn them under.

It is light draft—Actual test has demonstrated that the Corr Sulky Plow, with the additional weight of a driver, draws lighter than a walking plow, cutting a furrow of equal width and depth.

It is always level—By reason of the Independent Crank axles it can be raised or lowered to any desired position and still kept level.

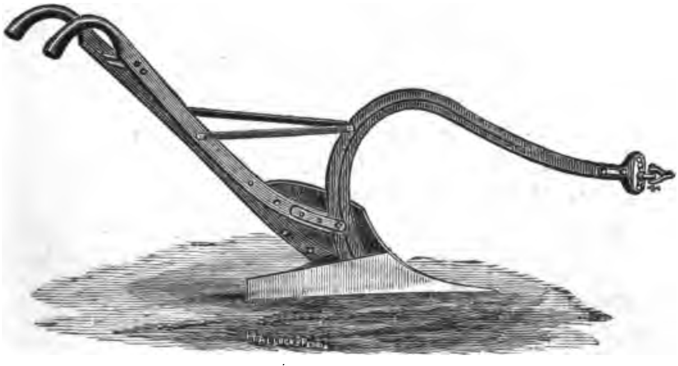
It has a Self-lift—The tongue being hinged to the frame, and the draft direct from the end of the beam, there is no side strain or weight on the horses necks, and the plow is raised by the power of the team, and can be adjusted in an instant from clear out of the ground to 10 inches deep—the land side being always level, and bearing evenly on the point and heel.

It is economical—As it obviates the purchase and use of a stalk cutter, and is well made of good material.

It is simple in construction—Can be operated with ease by a boy or girl. We furnish with each plow a 16-inch Caster Coulter, three horse whiffletrees, and neck-yoke complete.

Marsh Harvester Manufacturing Company, 14 and 18 South Canal street, Chicago.

TWO-HORSE WALKING PLOW—IRON BEAM.



This is No. 29, by the *Peoria Plow Co.*, *Peoria, Ill.*

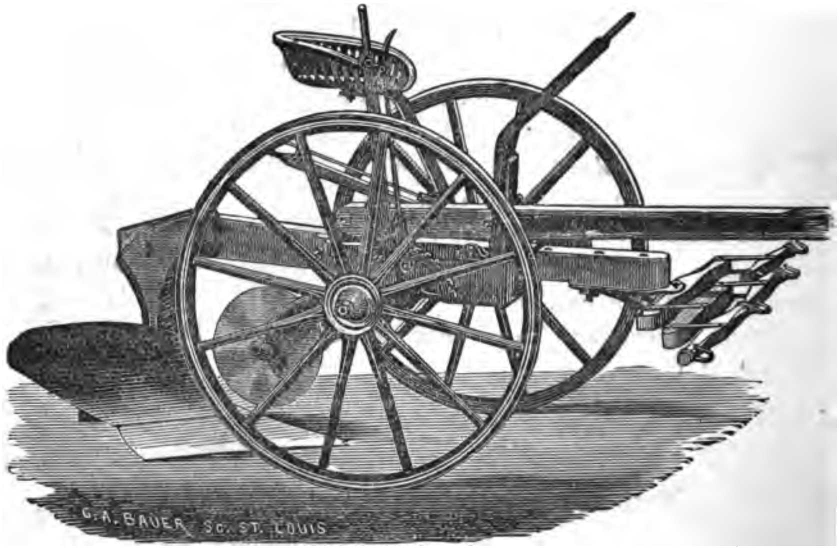
[No cuts nor descriptions were received for Nos. 11, 12 and 13.]

Was entered as No. 10 by L. Yinger, St. Louis, Missouri, and its record may be seen in the report.

I claim that my patent on Sulky Plow is the best and oldest patent on record, granted August 3, 1869.

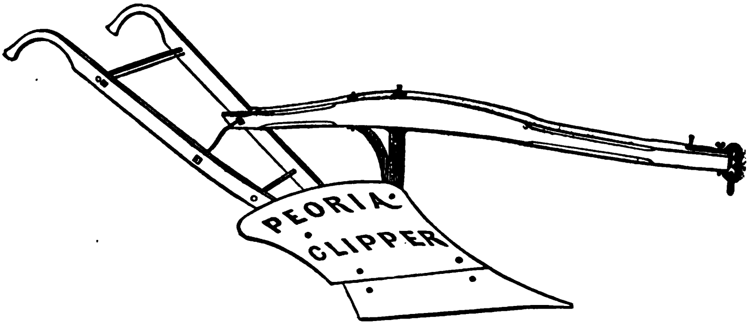
L. YINGER.

THE SLUSSER SULKY ATTACHMENT FOR GENERAL PURPOSES.


G. A. BAUER Sc. ST. LOUIS

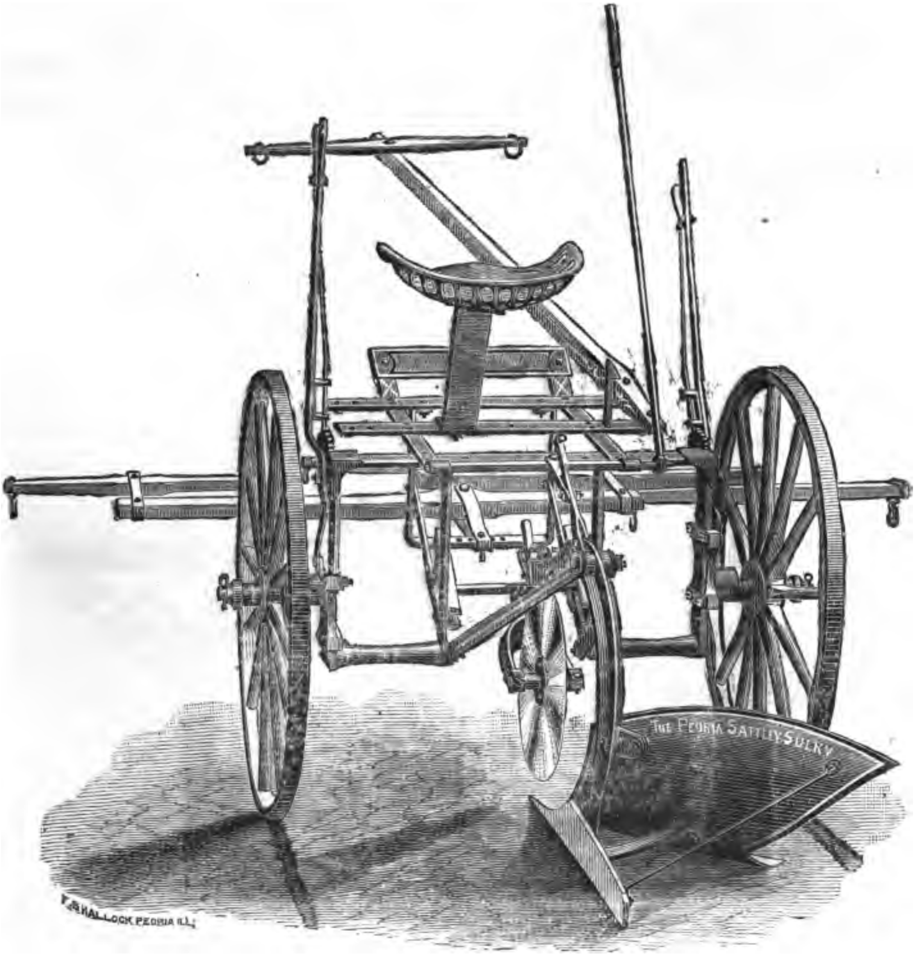
This is No. 9, entered by L. Yinger, St. Louis, Mo.

TWO-HORSE WALKING PLOW—WOOD BEAM.



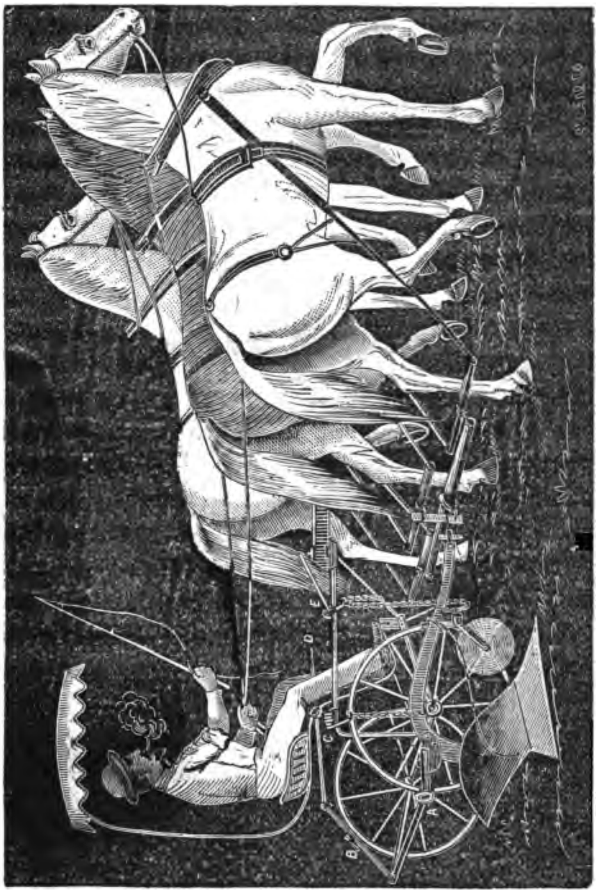
This is No. 28, entered by the *Peoria Plow Co., Peoria Ill.*

THE SATTLEY SULKY PLOW.



This plow was entered as No. 27, for general purposes, by the *Peoria Plow Co., Peoria, Ill.*

HUGHES' SULKY PLOW FOR OLD LAND.



This is No. 20, entered by the *Hughes Riding Plow Co., St. Louis, Mo.* Its record may be found in the Report.

Only two levers are used in adjusting this plow, one to throw it into or out of the ground, and the other, marked "D," to tilt the share so that it is always level, no matter what the slope of the land may be.

Running outside of the wheels, it turns square corners without taking it out of the ground, thus saving half an hour or more in plowing an acre—finishing up the land without the necessity of plowing head lands at each side of the field. The carriage and team being on the unplowed ground the ends of the lands are not tramped down by the team.

It runs light, the lateral pressure of the mold-board being thrown upon the wheels, relieving the land side from most of the friction against the wall.

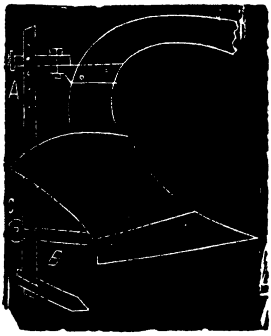
It is so simple that any one competent to drive the team can do the work.

It is the only sulky plow to which a sub-soiler can be attached, insuring deep plowing and under-drainage without the use of the second team and driver.

A prairie breaker, "black land," or other plow with suitable beam, can be attached to same carriage in a few seconds.

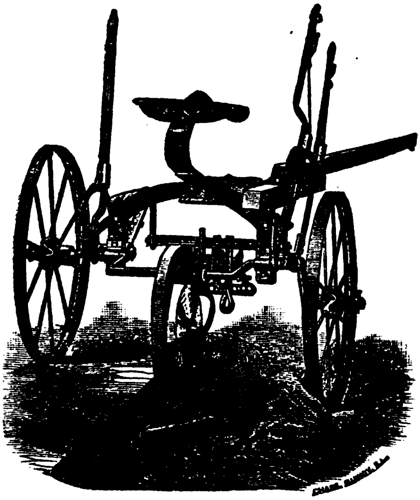
It is durable and light, being almost entirely of wrought iron and steel, and the hubs of the wheels (iron or wooden,) being of chilled iron, and the axles protected by cast thimble-skeins.

HUGHES SULKY PLOW, WITH SUB-SOIL ATTACHMENT.



This cut shows the sub-soil attachment in No. 50, entered by *Hughes Riding Plow Co., St. Louis, Mo.*

EVANS SULKY PLOW, FOR GENERAL PURPOSES.



This is No. 31, entered by the *Moline Plow Co., Kansas City, Mo.*

No. 32, by the same company, is similar to No. 31, but has special adaptations to old lands.

Points explained in writing, at request of Prof. Swallow:

First. Quality of work—Entry No. 31, being for a plow which combines the two qualities of turning bluegrass sod and cultivated land, equally well.

In the bluegrass sod, we wish to call attention to the smooth work accomplished, and the fact that we were able to furnish the land according to instructions of your foreman. Our last two furrows being of the same depth and both of them shallower than those preceding them.

In the cultivated land, with the same plow, we were enabled to cover all trash from sight with light draft.

This, we claim, is a great advantage to the farmer, as we have shown the same plow capable of doing *good work* in both places, and with a smaller expenditure of power than on a plow intended for one purpose only.

Second. Adjustability—We claim all the adjustments to be found on any other plow, viz.: Slotted iron at rear end of pole, three-horse clevis on beam. Two lever adjustments, etc., etc.

And in addition to these we claim a *third* or three levers—each wheel being set on a crank axle with independent levers, we are enabled to run our plow *level* under *all circumstances*, whether on side hills, deep or shallow plowing, opening or closing a land.

We also claim the simple manner of connecting our plow to frame, enabling us to put *any size* of plow on the frame in its proper position, so it shall run in *line* of the *draft* and not on a *twist*, as many of them do. Shares are made in duplicate and can be replaced at any time.

Third. Durability—We claim use of *wrought iron* for *all parts* liable to break in such implements generally. Our *arch* is of *wrought iron*, strong enough so we have *never* had *one broken*. Wheels of iron, with extra boxing in hub, which are easily replaced at a trifling expense.

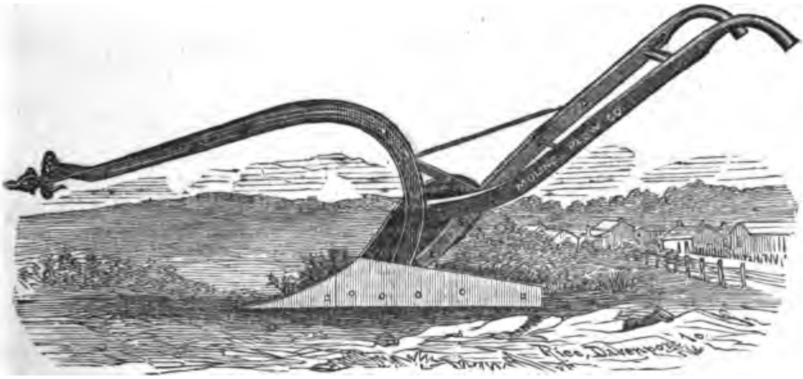
Fourth. Simplicity—We hitch direct to end of beam, and use our frame only to carry weight of plow and driver, and control the action of the plow.

Fifth. Draft—Shown by test.

EVANS SULKY PRAIRIE BREAKER.

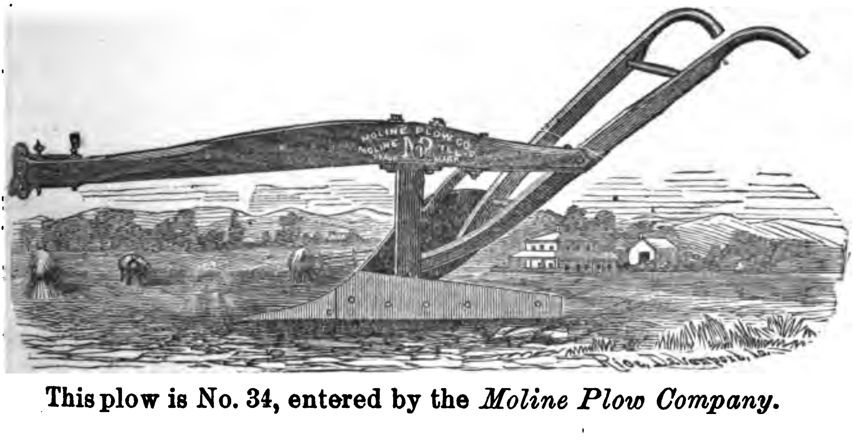
This plow is No. 42, entered by the *Moline Plow Co.*

TWO-HORSE, 14-INCH WALKING PLOW, IRON BEAM.


MOLINE PLOW CO.
Rice, Davenport, Io.

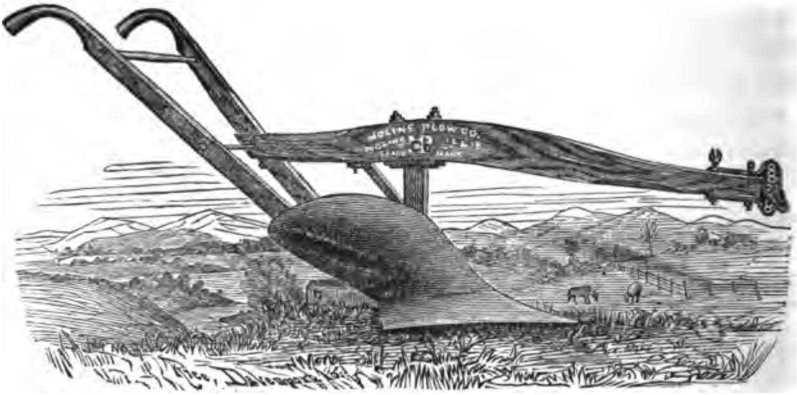
This is No. 33, entered by the *Moline Plow Company.*

TWO-HORSE, 14-INCH WALKING PLOW, WOOD BEAM.


MOLINE PLOW CO.
MOLINE ILL.
MP
TRADE MARK
Rice, Davenport, Io.

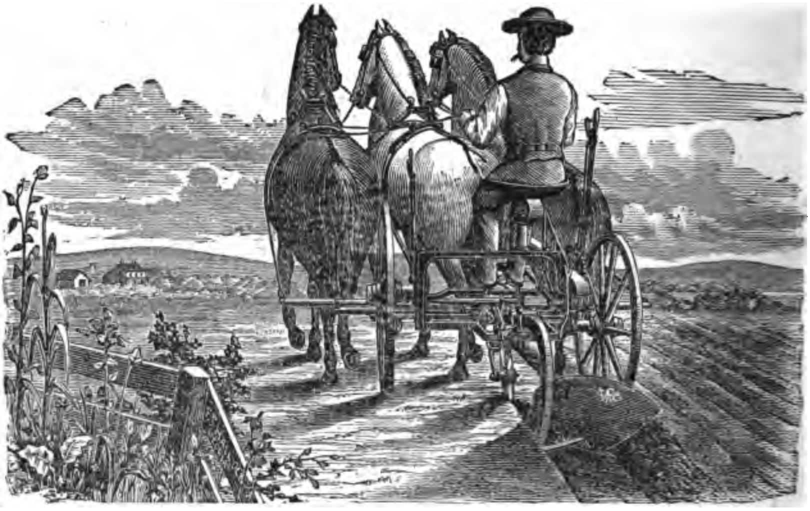
This plow is No. 34, entered by the *Moline Plow Company.*

TWO-HORSE, 12-INCH WALKING PLOW, WOOD BEAM.



This plow is No. 35, entered by the *Moline Plow Company.* The records made by these plows are in the preceding report.

WEIR SULKY PLOW FOR OLD GROUND.



This plow is No. 7, entered by the *Weir Plow Company, Monmouth, Ill.*

The cut represents our Sulky Plow, which has been thoroughly tested the past season, and its merits proven such as justifies us in assuring our patrons that it is destined to take precedence over every sulky in the market. It is made of *iron* throughout, and in every respect finished with the utmost care, furnished with either wood or iron wheels.

To reduce the weight, and at the same time retain the necessary strength, we make the frame of malleable instead of cast iron. It is supplied with an extra lever, so that in striking out lands, back furrowing, finishing up lands, or plowing on hillsides, the operator can at all times run the plow in a level position. The plow is elevated, by a compound lever, which gives such power that any boy who can manage a team can handle it with the *greatest ease*, raising it out of the ground quickly, even when plowing at greatest depth. The plow is suspended from frame, and team hitched directly to point of beam, avoiding all side and neck draft, and securing a degree of ease and steadiness not otherwise attained.

The lever for holding plow in the ground can be held rigidly in position, or allowed to play loosely—a decided advantage when plowing in very rough ground. Another strong point in favor of the "Weir" is that the team is hitched closer to the work than on any other sulky plow. The doubletree is so connected by a patent device with clevis, as to prevent it dropping when the tugs are slack, or the team unhitched.

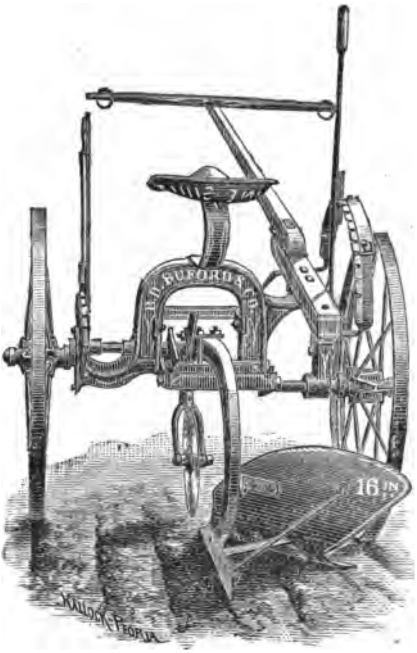
The Weir Sulky is decidedly preferable, because of its ease of draft, ease of management, adaptability to either two or three horses, simplicity of construction, lightness and durability, and because it can always be run level.

THE WEIR SULKY PLOW FOR SOD NO. 8,

THE WEIR SULKY PRAIRIE BREAKER NO. 45,

Are similar to No. 7, with such adaptations as fit them for the special work designed. Both were entered by the *Weir Plow Company*, and the records they made may be seen in the foregoing report.

BROWNE SULKY PLOW FOR OLD LAND.



This Plow is No. 36, entered by *B. D. Buford & Co., Rock Island, Ill.*

BROWNE SULKY PRAIRIE BREAKER.

This is No. 38, entered by *B. D. Buford & Co.*

BROWNE SULKY FOR TURF AND STUBBLE.

This plow is No. 37, entered by *B. D. Buford & Co.*

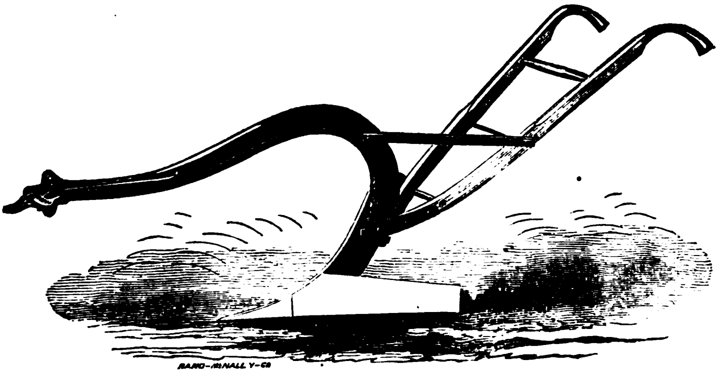
Nos. 37 and 38, are like No. 36; but have special adaptations for the work designed.

The plow is durable, being made entirely of iron and seel. The plow proper is managed by one lever, and in a moment set to plow any depth. The left hand lever is used to level the plow. When once set for depth, it need not be changed again for the same land The draft is direct from the beam, and changes, either to plowed ground or land, are made by the clevis, as in a common hand plow.

The wheels are forty inches high, insuring light draft. Its superiority consists in the ease with which it is handled, and set to plow any depth, and made to run level, even on side hills. By means of a plate attached to the ratchet, the lever can be either be locked or allowed to play loose, so that when working in clods or rough ground, the wheel will not throw the point of the plow out of the ground By a new arrangement the tongue can be made to follow the line of draft, and a strong feature of this plow is, it is always taking sufficient cut without pulling the horses to the land. Our long and successful career as manufacturers will be a guarantee that the plow will be well made, finished and hardened.

B. D. **Buford** & Co.

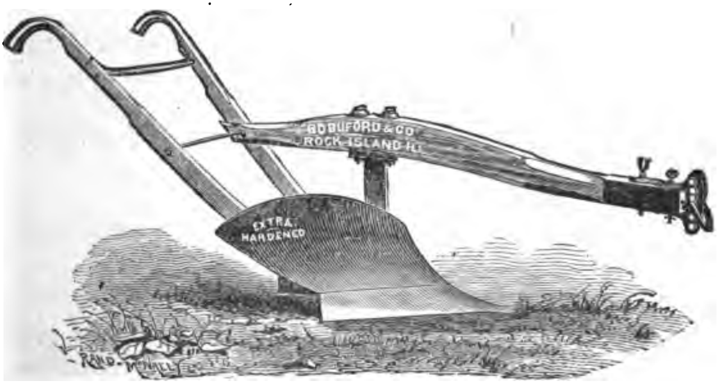
TWO HORSE WALKING PLOW, IRON BEAM.



This Plow was selected for the lecture table in the Agricultural Lecture Room.

This is No. 39 entered by *B. D. Buford & Co., Rock Island, Ill.*

TWO HORSE WALKING PLOW, WOOD BEAM.



This is the No. 40 entered by *B. D. Buford & Co.*

THREE HORSE WALKING PLOW, 16 INCHES.

This Plow was entered as No. 41, by *B. D. Buford & Co., Rock Island, Ill.* The last three Nos. 39, 40 and 41, are claimed to be the very best plows made, and their record made at the Trial may be found in the foregoing report.

TWO-HORSE WALKING PLOW.

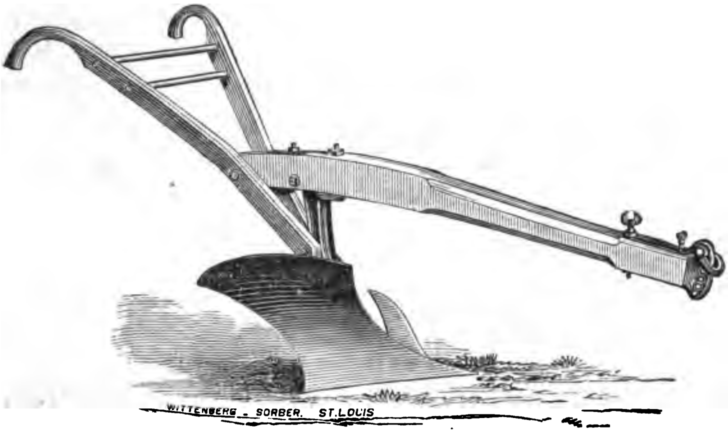
This is No. 22, entered by *Collins & Co., New York City*, and its record may be found in the foregoing report. The Collins' Plow was one of the two Champion Plows at the Great Plow Trial at Utica, N. Y., 1867. In a part of the tests it showed the lightest draft.

The special form of the plow gives to the turning slice an even motion, and, with the *least possible elevation of the same, brings the bottom soil to the top without quartering or pitching,* and leaves it in an even roll, well *pulverized and thoroughly overturned.*

The slice is dropped close to the furrow, but it is left sufficiently open for man or horse to walk. The plow is planned to do its work with the least wearing surface that can be used and secure good work in turning a thick furrow slice, thus avoiding all *unnecessary* friction.

To the fineness and hardness of the steel and the model designed to handle the furrow slice in the easy manner described, and the consequent light draft, we invite the close examination of every farmer who likes a good plow, or who desires to save his team.

TWO-HORSE WALKING PLOW, WITH FOUR SHARES.



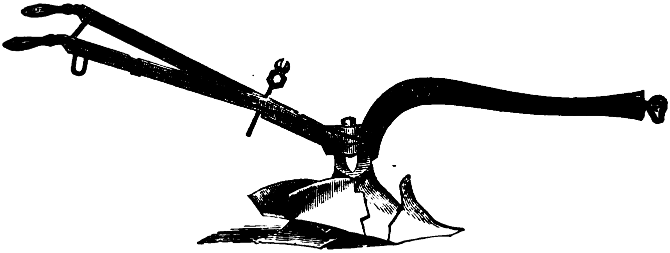
This Plow, No. 30, was entered by *J. Phillips*, *Smithton*, *Ill.*, and the record it made may be found in the preceding report:

The Grangers Gem Plow, was invented by Jos. Phillips, of Douglas, St. Clair county, Ill., and patented Dec. 7, 1875. It is built on a caststeel standard, composed of three prongs and a crosshead. The front prong supports the forward part of the share, mouldboard and landside, and is fastened on with two bolts. The rear prong supports the rear end of the landside, and is fastened with one bolt. The horizontal prong rests the share and mouldboard, which is fastened with two bolts. The beam is fastened to the crosshead with two bolts. The handles are bolted to rear end of beam and centre of standard, which forms a brace from beam to standard, one bolt passes through the beam and forms a cross with the rear bolt in crosshead to give the plow land. There is a cutter joined on front end of landside which cuts the furrow smooth on landside. Ten bolts puts the whole plow and stock together without a mortice or tenon.

This plow is cheap, strong and durable. It can be made by any smith, and can easily be changed to plow sod, loam or trash, as the plowman desires; or two or three mouldboards may be made of different shapes to fit the same standard.

SPEER REVERSIBLE PLOW.

Manufactured by *A. Speer & Son*, *Pittsburg*, *Pa.*

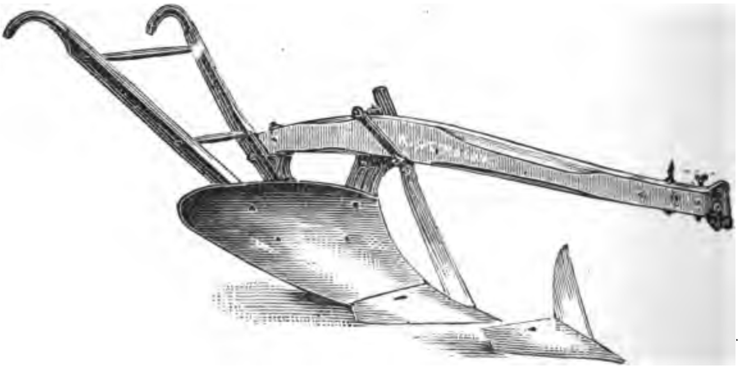


This plow did not reach us in time for the trial. It is unique in structure, and exhibits first-class mechanism in all its parts. It is reserved for the lecture-table in the Agricultural Lecture-Room.

This Plow is made with two fixed shares and two hinged mould boards. The beam and handles are continuous and attached to the upright by a bolt on which they swing, so as to run the plow with the two shares alternately. They are held in place by a socket so arranged as to be under the control of the plowman while he is guiding the plow and team.

When one end of the land is reached, the team turns and the beam and handles swing half the circle and are fixed to use the other share for the return furrow on the same side. The beam and handles are long and resemble the approved British patterns.

SPEER WALKING PLOW.



This Plow was entered as No. 11 by *A. Speer & Son*, ***Pittsburg***, ***Pa.*** The record made at the Trial may be found in the report.

We claim the best general purpose plow ever invented, and without doubt, after actual tests with other plows, the lightest draft plow made anywhere.

Cast or Steel Shares for each Plow.—Our method of chilling makes the mould-board and shares so hard that they cannot be drilled or filed. It is of uniform hardness.

Warranted to scour in any soil, and to do the work equal and with less draft than any other plow.

TWO-HORSE WALKING PLOW.

No. 16 was entered by *Jasper & Kroog*, *Washington*, *Mo.*, and its record may be seen in the report:

We claim for our plow some advantages which may be overlooked, unless it be carefully examined. The share is provided with an extra plate, riveted to the wing of the share and welded solidly with the same to the land-side bar. This forms the seat for the mould-board and gives the share great strength and durability. The wing never can get parted from the land-side bv wearing out. There are no loose flanges on the share. The standard is formed in such shape as to give the most possible strength to the plow, and put no strain on the mould-board. The whole construction is very simple and strong. No castings on the whole plow.

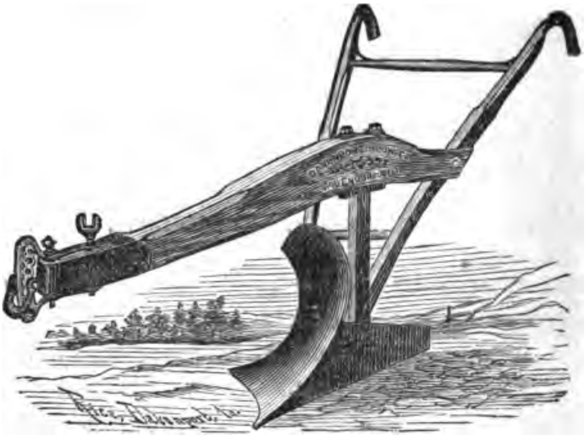
JASPER & KROOG.

WALKING PLOW, WITH WOOD IN LANDSIDE.

This plow was entered as No. 17 by *Jasper & Kroog.*

In this plow a piece of wood is set in the land-side "to keep the bar from scouring on the land and keep it it full strength till the whole share is worn out. That piece of wood may be taken out if the ground be too wet and sticky."

DAVENPORT WALKING PLOW.

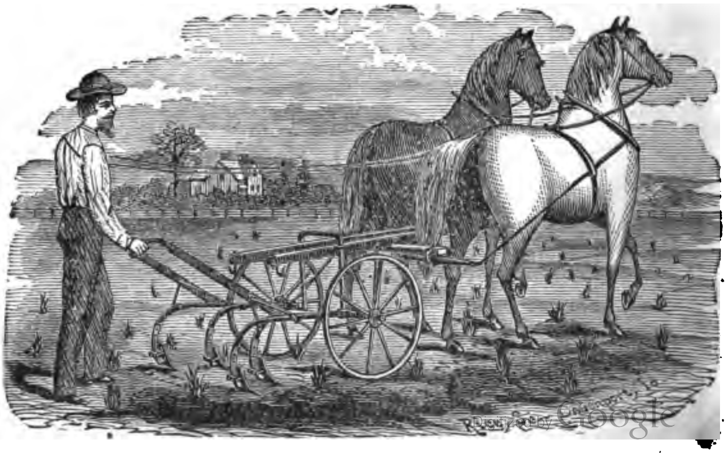


Many of these plows described in this Appendix, and embraced in the foregoing report, are on exhibition at the Agricultural College, and will be entered at the next Boone County Fair.

CULTIVATORS.

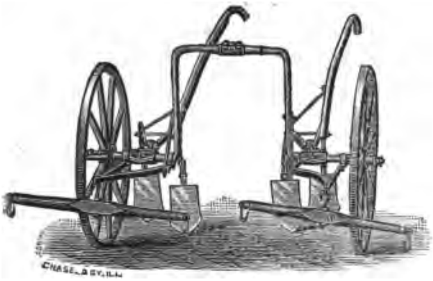
The following cuts and descriptions will give a good idea of the structure and adaptations of the cultivators represented at the late trial.

WESTERN CULTIVATOR.



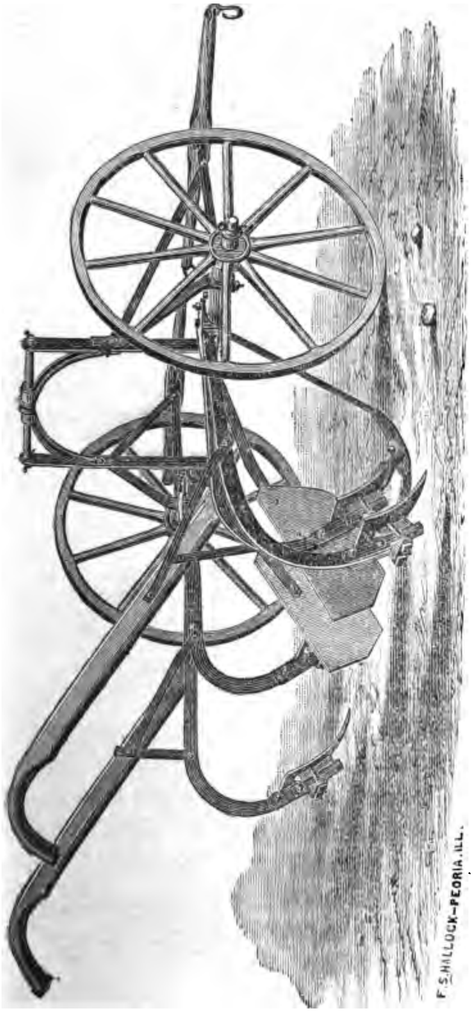
This cultivator was entered as No. 1 by the *Moline Plow Company*, *Moline*, *Ill.* This instrument is made with wood or iron beams, and with or without a tongue, so that purchasers may have a choice.

NEW ERA CULTIVATOR.



This cultivator was entered as No. 2 by the *Moline Plow Company*, *Moline*, *Ill.* The New Era is made with wood or iron beam, to suit purchasers.

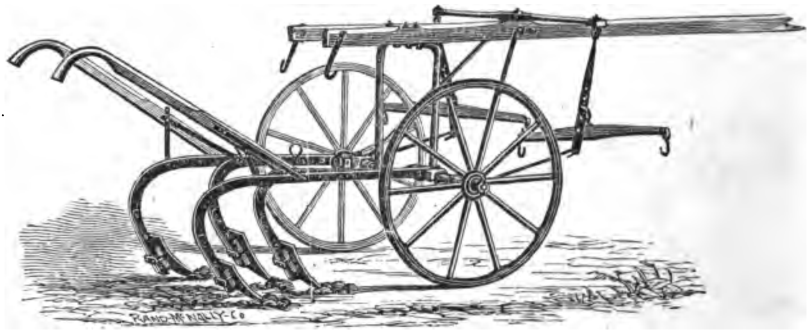
COMBINED RIDING AND WALKING CULTIVATOR.


F. S. HALLOCK—PEORIA, ILL.

This cultivator was entered as No. 5, by *B. D. Buford & Co.*, *Rock Island*, *Ill.*

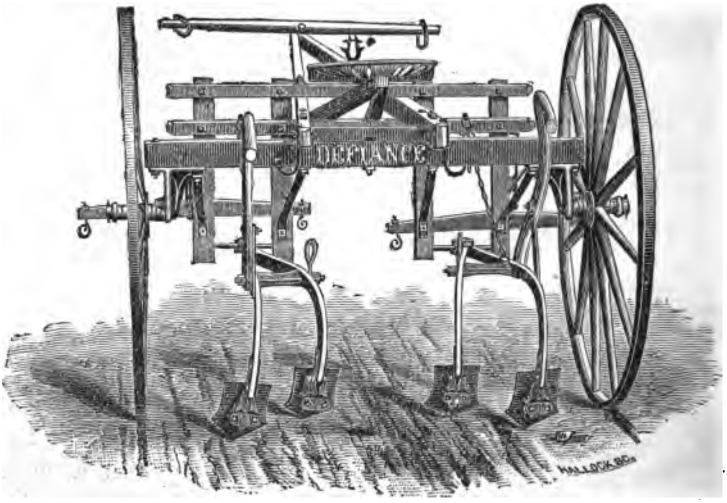
This instrument is quite simple and durable—the ends of beams and blocks behind shovels being Bessamer steel, thereby making them very light with great strength. This cultivator also has break pins same as on walking cultivators. On said cultivator we have also a perfect evener, with draft rods passing from said evener over or underneath a friction roller that obviates all draft on the horses' necks, whether riding or walking. We merely give you the mechanical principles, coupled with the kind of material used in all cultivators, without going into a lengthy detail of either mechanical principle involved or material used.

DEFIANCE CULTIVATOR.



This cultivator was entered as No. 6 by *B. D. Buford & Co.*, *Rock Island, Ill.*

Another view of the Defiance, showing other parts of the structure.



We build three different styles of Cultivators.

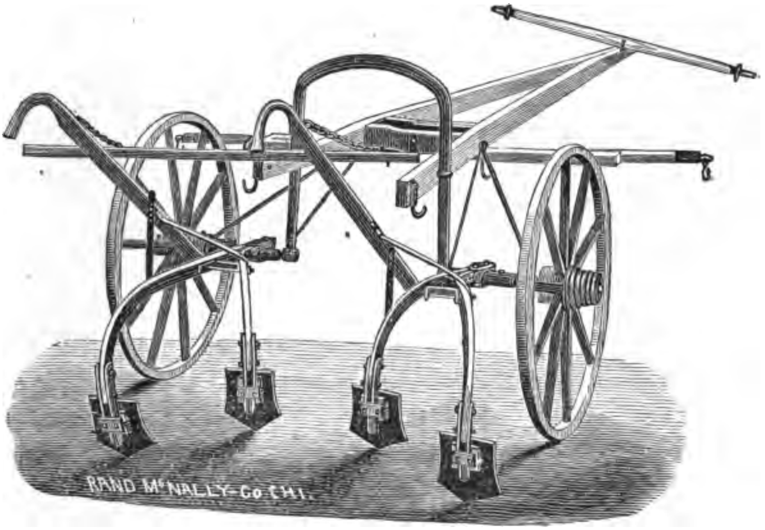
First—One with a double and split pole, either iron or wood beam—which we call the Black Hawk.

Second—A single tongue Cultivator, wood and iron beam, that we call the Defiance—said Cultivator having low hitch.

Third—A tongueless Cultivator, wood and iron beam, that we call the Bulldozer.

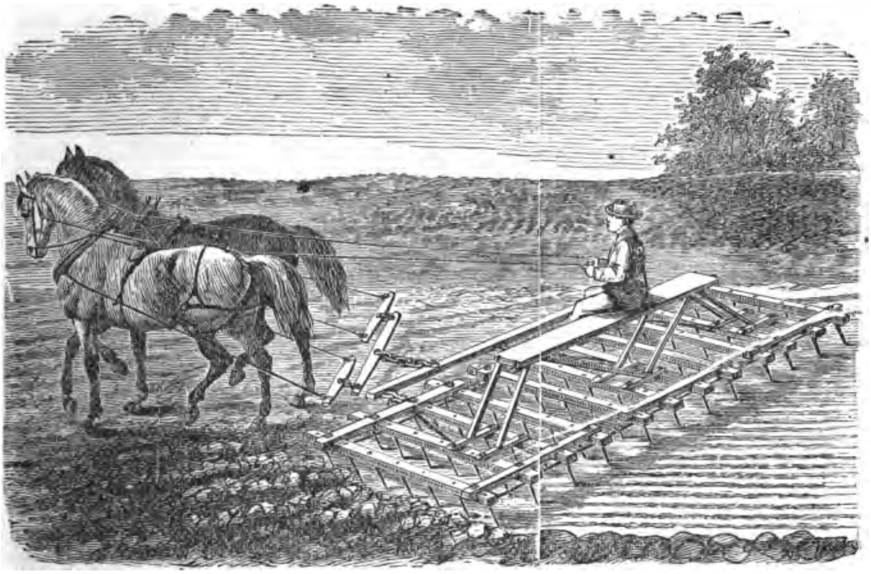
Each of the above Cultivators is a duplicate of the other, with the exceptions of the changes or styles mentioned above, each having a continuous wrought iron arch. Simple and durable coupling with break pins at the slank's—with steel blocks behind the shovels, making them very simple and durable, and not liable to get out of order.

BLACK HAWK.


RAND McNALLY-Co CHI.

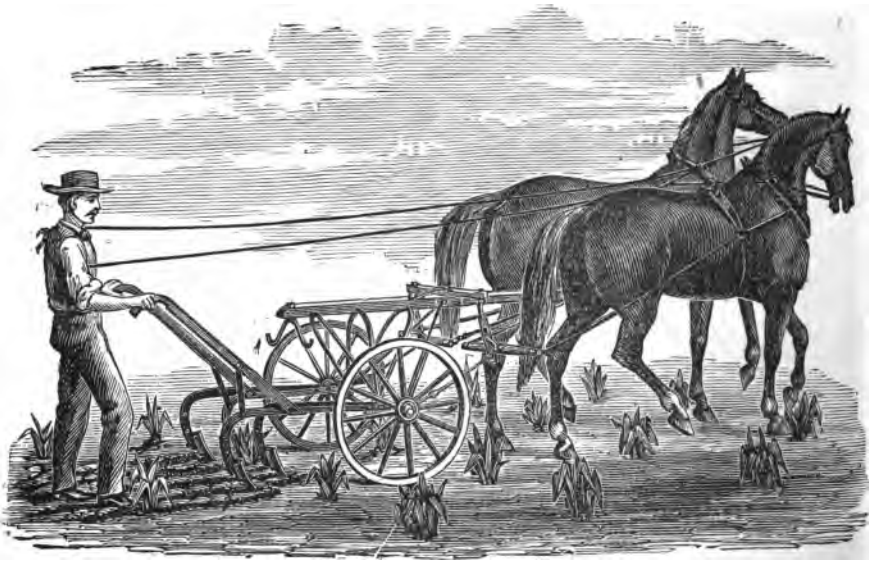
This Double-Tongued Walking Cultivator was entered No. 9, by *B. D. Buford & Co., Rock Island, Ill.*

THE THOMAS SMOOTHING HARROW.



This is light, durable and efficient as a cultivator of young crops, such as corn and wheat.

THE DAVENPORT CULTIVATOR.



The Cultivator of the Davenport Plow Company did not arrive in time for the Trial.

Many of the above named instruments are on exhibition and in use at the Agricultural College.

G. C. SWALLOW,
Dean of the Agricultural College.

Agriculture.

AN ADDRESS BY COL. E. C. MORE, OF BOONE COUNTY, BEFORE THE STATE BOARD OF AGRICULTURE.

MR. PRESIDENT, LADIES AND GENTLEMEN:

Around the science of agriculture, upon which I have been invited to address you, cluster the halo and traditions of remotest antiquity. Its history extends far back through the flight of centuries, even to the early dawn of creation itself, for when the fiat of Omnipotence called into being our first parents, they found themselves in the midst of horticulture, fresh and perfect from the hands of Deity, the duty assigned to them being to "keep and dress the garden." And when later, their folly and disobedience caused their expulsion from the limits of this beautiful paradise, the culture of the ground was especially enjoined as an occupation, and the future difficulties attending it were clearly foreshadowed. "Cursed is the ground, for thy sake; in sorrow shalt thou eat of it all the days of thy life; thorns also, and thistles, shall it bring forth to thee; and thou shalt eat the herb of the field; in the sweat of thy face shalt thou eat bread till thou return unto the ground." Such was the malediction that petrified the hearing of the first pair of agriculturists, as lingering they gazed for the last time through the portals into the blissful confines they might never hope to regain. Thus went they forth to become tillers of the soil, and thus my friends, six thousand years ago began the history of the science of agriculture.

We may fairly presume that Adam and Eve were charter members of the first practical grange organization, and doubtless when Cain and Able were initiated, Adam was found officiating as "Worthy Master," and Eve as "Pomona" or "Ceres," including, perhaps in her role, some of the duties of lecturer, it may have been *curtain lecturer*.

The early history of agriculture is necessarily much obscured by the accumulated mists and cob-webs of time; we have only here and there faint glimpses through the silent, shadowy corridors of the past, but enough to assure us that for many centuries it, together with stock raising, constituted the chief occupation of mankind.

We are told, for instance, that Noah, after the waters of the flood had subsided, turned his attention to agricultural pursuits, making rather a specialty of grape-culture. Noah was well advanced in years at this time, being some six hundred years of age; and, on one occasion we are informed, he indulged to freely in the generous juice of the grapes his careful hands had nurtured, he was decidely overcome. But when we remember his advanced age, and the terrific experience he had so recently known from an unlimited supply of water, we are constrained to overlook this one deviation from principles of strict sobriety, more especially, as at that early period, the wholesome restraining efficacy of *blue* ribbon had not been discovered, and the excellent Murphy movement, if existing at all, had made but little progress. At all events, modern agriculturists can with all safety imitate the example of Noah's life; for if they continue to live in perfect sobriety until they are six hundred years old, society will not criticise them too harshly if they should even go so far as to get on an occasional spree from that time on till the end of their natural existence.

The Israelites were a nation of husbandmen, and when their crops failed, on one occasion, they were compelled to emigrate to the fertile valley of the Nile, where Joseph, blessed with divine wisdom, had prudently accumulated a goodly store of provision throughout the dominions of Pharoah. So also were the Assyrians, the Egyptians and the Chaldeans. The great law-giver, Moses, was a husbandman, and at one time kept the flock of Jethro, his father-in-law, the priest of Midian. But, of course, among all these early races, the principles of agriculture and husbandry were but scantly understood.

I imagine that Elisha, with his plow and twelve yoke of oxen attached, would hardly have broken a twentieth part of the ground, nor half so well, as a modern Western farmer would, with a good span of mules and a first-class sulky plow. Or, just suppose that Gideon would have suddenly been transported from his threshing, near the wine press, a few thousand years ahead, and could have seen one of our modern threshing machines in full operation, turning out from five hundred to a thousand bushels of clean wheat in a day, don't you think it would have stirred the soul of this pious old warrior to its very depths? Or, to come a little nearer to our own day and generation, what if classic Virgil, who in his exquisite pastorals, gives us a graphic description of a Roman plow, and how it should be made, of what timber, etc., what if he could have seen one of our modern riding plows moving gracefully over the prairie, turning over a smooth sod of eighteen or twenty inches in width, wouldn't he be ready to swear that he never saw a Georgic or wrote a Bucholic, in all his life. I rather think he would.

The fact is that a few thousand years have wrought some wonderful changes. The history of agriculture, which in reality, includes the history of the world's civilization, show that in the race of progress, the fine arts have always out-stripped those more practically useful. In other words, man's esthetic nature has been of more rapid growth than his utilitarian. For instance, it is comparatively a short time since forty or fifty miles a day was considered fast traveling, and two months a reasonably quick voyage across the Atlantic, whereas, now we are whirled across the continent, at lightning speed, in a few days, and but little over a week is regarded as necessary for ocean steamers to make the transit between New York and Liverpool. Contrast, if you please, the former slow process of sending news and letters with the recently invented telegraph system, by which, in communication, time and space are completely annihilated.

Nearly all the wonderful inventions by which labor is simplified and mechanical science advanced, are of comparatively recent date, the result of the accumulated researches and experiments which have been going on since

> "Yonder spheres sublime,
> Pealed their first notes to sound the march of time."

Not so in the department of esthetics. There you find the most gifted sculptors turning, with enthusiastic admiration, to study the matchless forms which a Phidias, a Praxiteles carved in marble two thousand years ago; the builder still imitates the graceful columns of Grecian architecture; the poet still draws inspiration from the classic verses of Homer and of Virgil, and studies well the "Ars Poetica" of Horace. The beautiful art of painting has been of much slower growth; yet what painter of to-day dares hope to rival the magnificent productions of Raphael, of Titian, of Rembrandt, of Murillo or Correggio?

The same rule holds good in tracing the progress of agriculture, the most useful of all the arts and sciences. And he who would learn its history must begin where commences the history of all civilization, with the bible. He will find, as it were in the beginning, a tiny rivulet of knowledge, growing and expanding with the progress of the Israelites, the Egyptians, the Assyrians and the Persians, still enlarging under the cultivation and advancement of the polished Grecians and sturdy Romans. He must follow the stream on through the cavern-like darkness of the middle ages, amid the Gauls and Britons, the Saxons and Saracens, until, with the progress and enlightenment of the Anglo-Saxon, the German, the French, and the American races of the nineteenth century, this little rivulet has attained the proportions of a broad, majestic river, flowing ever onward, with ever increasing dimensions, to the ocean of eternity. In the beginning, the veriest rill; to-day, in the light of science and progress, a thundering Niagara. And who knows but that even yet, with all our boasted achievements of past years and centuries, the science of agriculture may be in its comparative infancy. Could we imitate old father Noah, in his habit of longevity, by the time we approached the green old age of nine hundred and fifty years, we might perhaps look back upon the present status of agriculture and all other progress, about as the towering inhabitant of Brobdinag would have scanned the pigmy Lilliputian.

The student of agricultural history will be impressed with another fact, viz: The higher rank and dignity which has, with the advancement of civilization, been awarded to agricultural pursuits. There was a time when almost all manual and even intellectual labor, was regarded as degrading. How strange that the *creature*, man, should ever be ashamed to imitate the infinite *Creator* of the universe, who worked six days and rested on the seventh, lending a charm and dignity to labor, and furnishing an example that should last forever to the remotest generations of mankind.

The art or science of agriculture may justly claim the first rank in the scale of importance, for upon it, to a great extent, all the others depend. Johnson says of it: "That art on which a thousand millions of men are dependent for their very sustenance, in the prosecution of which, nine-tenths of the fixed capital of all civilized nations is embarked, upon which, probably, two hundred millions of men expend their daily toil, and which is, besides, the only fixed basis of national wealth and greatness, that art must confessedly be the most important of them all; the parent and precursor of all other arts." "It constitutes the most healthful, the most useful, and the most noble employment of man." This is the language of the truest type of manhood that ever trod upon American soil; of him who was "first in peace, first in war, and first in the hearts of his countrymen."

Without intending or wishing to disparage other pursuits and employments, I am still content to agree with the great and good Washington.

It is a great mistake to suppose that the life of the agriculturist and husbandman is necessarily bounded by the narrow limits of upturning the soil, sowing seed, warring upon weeds, looking after stock, and similar occupations, involving merely manual labor. On the contrary, he finds before him a more extended field for industry and observation than, perhaps, any other occupation could afford. In addition to all the minor details of farm-life—which, in themselves, are highly interesting and important—he who aspires, in this age, to the rank of successful agriculturist, must become the possessor of a wonderfully varied store of knowledge and information, which, in turn, must be guided and sustained by the high attributes of courage, patience and perseverance. The head of the farm is, to a limited extent, of course, like the commander of an army. He is the governor of a small province. All hands come to him for guidance and instruction, and all look to his example ; and the general prosperity of the little commonwealth will largely depend upon his good management. He should, therefore, be a man of fine administrative ability. Perhaps no better school can be found than this for developing those elements of character which qualify a man to govern others, which qualify him to mould and control the destinies of communities or nations.

History furnishes numerous illustrations of this fact. Who is not familiar with the story of the wise and brave Cincinnatus? At one of the most critical periods of Roman history he was chosen Dictator, always a last resort with the Roman people. Cincinnatus was diligently plowing on his farm when the delegation arrived from Rome to apprise him that his country needed his services, and to the sturdy old Roman, the call of his country was ever as the voice of Heaven. He immediately assumed the office, rallied the defeated forces of his countrymen, and in a few days, after a complete victory over the enemy, led them back in triumph to the "Eternal City." His wisdom and valor were only exceeded by his modesty and integrity. After exercising this, more than regal power, only fourteen days, he resigned, and again sought the retiremement of his country home.

Cato learned the art of being grand in simplicity, and laid the foundations of his future greatness by imitating a neighboring successful farmer. Cato became a successful farmer himself, and has left a work on husbandry, which is, probably, the oldest extant, and contains many valuable ideas. He begins by saying that "agriculture is preferable to merchandise as being less hazardous, and to usury as being more honorable."

Elisha left the plow to receive the Prophet's falling mantle. So, also, Gen. Putnam, of American history, left the plow standing in the unfinished furrow, to take a prominent part in establishing his country's freedom.

History is replete with instances of men who have left the peaceful walks of country life, to reach the highest distinction in both civil and military pursuits. It is a mistaken notion that the man who devotes himself to agricultural pursuits, and makes his home in the country, is constrained to lead a plodding existence, illumined with but few ideas. His field of observation and study is absolutely boundless. Why, it was in an orchard that Sir Isaac Newton discovered one of the fundamental laws of Nature, one which the Great Creator had impressed on matter, when, from His omnipotent hand, the countless members of untold planetary systems were evolved and sent whirling through the boundless realms of space.

The student of modern agriculture discovers a sisterhood between the different sciences; they all belong to the great family of Nature, and each, in turn, stands ready to aid and assist the other. Thus, Botany may be regarded as really a part and parcel of agriculture; the aid of Geology is needed to explain the different strata of our soils, and unfold the advantages or disadvantages of bringing them to the surface. A knowledge of Zoology and Entymology is most important to assist the good husbandman in giving proper care and attention to his domestic animals, as well as in learning how, successfully, to meet and repel the piratical invasions of those animals generally known, under the euphonious appellation, "varmints," and the insects which infest his trees and plants. Then, too, the farmer of to-day is led into the study of Chemistry; if he does not find leisure or inclination to trace to their constituent elements the multitudinous ramifications of *organic* and *inorganic* matter, he should at least know something of the analysis of different soils, of the formation of plants and vegetable tissues. He must be reasonably familiar with the proper application of phosphates and manures.

In the manufacture of vinegar, wine, etc., as well as in the construction of suitable buildings in which to preserve fruit, grain and other crops, a knowledge of chemistry is of great importance; and if the granaries are not constructed with some reference to zoological principles, the proprietor will be likely to experience an immense amount of *gratification*, (spelt, however, without the *g*).

Agricultural chemistry was a study in which the colossal minds of Sir Humphrey Davey, and Liebig and Lavoisier found great interest and pleasure; and, for much valuable information on the subject, as well as many important discoveries, the world is largely indebted to their laborious researches.

I will mention one other fact which cannot well escape the notice of the student of agricultural history. It is the wonderful increased advantages in possession of the modern agriculturist for the acquisition of knowledge, which is the *sine qua non* of success in every department of human affairs. But recently, and from sire to son were handed down the scanty knowledge and traditions of past generations, many of the latter being little else than superstitious nonsense. Improvement could hardly be expected outside of actual experiment; and that, in the pursuit of husbandry, was necessarily slow. To-day, however, in the midst of universal progress, the American farmer finds himself in a land teeming with schools, and colleges and universities; to which, in many instances, has been added an agricultural department; all presided over by learned professors, whose high mission it is to instruct.

A fund has been set apart by our great State of Missouri for the propagation of scientific agricultural knowledge. Gentlemen of distinguished ability and attainments have been organized into a *Board of Agriculture*, whose duty and whose pleasure it is to collect and distribute valuable information on this important subject. Libraries are at hand; books, papers, magazines and periodicals are to be found everywhere. The appliances for disseminating information and knowledge have been so multiplied that no one, unless of his own volition, need now remain in agricultural ignorance.

No, ladies and gentlemen, the American farmer *may*, if he choose be an ignorant clod-hopper. He *ought* to be, pre-eminently a scholar, a healthful, happy and a useful man. He stands a priest in the great temple of nature; and in the midst of his fields and flocks, breathing the pure atmosphere of the country, with simple tastes and habits, though his features may be bronzed by the exposure of honest toil, and though his carriage may not be so graceful, he can yet well afford to look, without envy, upon the pampered ease and feverish bustle and excitement of those who dwell in towns and cities. *His* grand prerogative, it is, to commune with nature. And, as God's ways are higher than man's ways, so nature, which is the handiwork of the Almighty, is infinitely above and beyond any of the productions of art.

He should be a just and honest man. For, as Virgil expresses it: Though he inhabit no lofty pile, with haughty towers; though his home may lack the brocade hangings and the Tyrian purple and the throng of liveried servants, yet still he may enjoy the broad fields, and fraudless innocence and peaceful rest are his.

> "Yet caves, and living springs and airy glades,
> And the soft low of kine, and sleepy shades
> Are never wanting; there lowering herds abound;
> And youth, inured to toil, and thrift are found;
> And aged sires revered; and altars crowned.
> There justice left, when she forsook mankind
> The last impressions of her steps behind."

With all his pure surroundings, the farmer should be pre-eminently a pure and upright man—for what more natural than to "turn instinctively from nature, up to nature's God?"

I have spoken to you, ladies and gentlemen, I am well aware, in a somewhat rambling and disconnected manner, and have endeavored to present a few suggestions hastily and imperfectly linked together. I trust, however, that my audience will pardon any imperfections they may have discovered; remembering that he who addresses you is also devoting himself, in a quiet, modest may, to agricultural pursuits, and should a farmer come before you, on this occasion, with an address, bearing the impress of great care and labor in its production, you would, most naturally, censure him for having consumed too much of this beautiful farming weather in a manner that was scarcely legitimate.

Blooded Cattle.

HEREFORDS.

BY T. L. MILLER, BEECHER, ILL.

As this breed of cattle are now claiming the attention of cattle men throughout the country, I have thought best to incorporate in my report such facts as I could command in reference to their history. I have, therefore, made extracts from the Albany Cultivator for 1840, 1841 and 1849.

Soon after this date, in 1851, Mr. John Humphries and Mr. Thos. Aston, of Elyria, Ohio, imported several animals, and, 1860 or '61, Mr. F. W. Stone, of Canada, made quite an importation, and has made several since; from these importations they have been distributed through the Western States.

In 1872, Mr. T. L. Miller, of Beecher, Ills., made purchases from the descendants of these importations; and in 1873 made another importation from England. From this date they have made very rapid progress to public favor. This has been especially true on the plains. Mr. M. recognized their fitness for the grazing of the plains, and made special efforts to introduce them into that country; and they are accepted, by those who have used them, as the best for that purpose. And the demand, if not in excess of the supply, is at least fully equal to it.

With these remarks, I submit the quotations referred to as from the Albany Cultivator:

As this valuable breed has been introduced, and is increasing in several sections of the country, we offer a few remarks in reference to its history and qualities:

We have mentioned, in a previous chapter, that the Herefords are a branch of one of the original stocks of Britain. They have been known in certain districts for an indefinite period, but it was not until after the middle of the last century that any systematic attempts were made to improve the breed.

The first effort of this kind, of which we have any authentic account, was made by Benjamin Tompkins, of Wellington Court, Herefordshire. He commenced, according to Prof. Low, about the year 1776, with two cows, which, previous to his purchase of them, had often attracted his attention, on account of their singular aptitude to fatten. Mr. Eyton, the compiler of the "Herd Book of Hereford Cattle," states that he was informed by the family of Mr. Tompkins, that one of the cows was a grey, and the other a dark red, with a spotted face; the former, Mr. T. called Pigeon, and the latter, Mottle. It appears that Mr. T. kept two families from these two cows—one of a grey color, called the Pigeon branch, and the other of a red color, with white or mottled face, called the Mottle branch; and they have been continued to this day. The Rev. I. R. Smythies, of Lynch Court, Herefordshire, a gentleman who, for a long period, was distinguished as a breeder of Hereford stock, speaking of the two families alluded to, in a late number of the Mark Lane Express, says: "The grey ones are considered the oldest breed, and by many people considered the best; from long experience, I am inclined to think they possess more constitution and more quality than the white-faced ones, and generally more size than the mottled-faced ones."

From the two cows mentioned, Mr. Tompkins bred a large herd, from which he supplied other breeders with choice animals, during his lifetime, and shortly after his death, in 1819, the entire stock was disposed of at public auction. The prices obtained deserve notice: Fifty-two animals, among which were twenty-two steers, from calves to two-year-olds, and two heifer calves, brought the aggregate sum of £4673, 14 s., averaging £99, 17 s., 6d. ($449.37½) each. One bull sold to Lord Talbot for £588, and several cows and heifers brought £215 to £273 each.

This stock was purchased by breeders in different parts of the kingdom, and laid the foundation of many eminent herds. (See Herd Book of Hereford Cattle, app. 1 to 23.)

Another noted early breeder of Herefords was Mr. Tully, of Huntington, near Hereford. His were chiefly of the grey stock; and Mr. Smythies, in the article above referred to, states that their descendants are still known as "the Huntington breed."

Mr. Smythies was, for forty years, one of the largest breeders of Hereford cattle in England, rearing, as he states, about seventy calves yearly. He purchased his first stock, in 1802, of Mr. Tully, of Cliro, a relative of the before-named gentleman of this name. He was induced to adopt this stock by the recommendation of the celebrated gracier, Mr. I. Westcar, of Creslow, near Aylesbury. Mr. Smythies relates, that, meeting Mr. Westcar at the Hereford Fair, the latter remarked: "This is the fiftieth October fair I have attended in this town, without missing one. I graze five hundred oxen every year, and the best beasts I ever fed were bred by Mr. Tully, of Huntington, and Mr. Skegrue, of Stratton Court, both near Hereford." Mr. Smythies closed business in 1843, at which time he sold, at public auction, 131 head of cows, heifers and bulls. He had a previous sale in 1823, at which sixty-six head of breeding stock were sold. We have not the prices obtained at either sale.

The late Mr. John Price, of Poole House, Dorcestershire, commenced breeding Hereford cattle in 1814, with several animals purchased of Mr. Tomkins, above mentioned. He continued to breed on an extensive scale till 1841. In October of that year, he disposed of his stock at public sale. Ninety-nine animals—cows, heifers and bulls—brought an aggregate of £5,328—averaging £53 16*s* 4½*d* each. At a previous sale, in 1816, he sold 126 head of Herefords, comprising fourteen bulls of various ages, six bull-calves, 106 breeding cows, heifers and calves, which together, brought £6,850 12*s* 6*d*—averaging £54 8*s* 2*d* each.

We deem it important to state these prices, that it may be seen how they compare with those of other breeds. Numerous other sales of Herefords might be cited, at which prices about as high as the foregoing were obtained.

Some of the principal breeders of Herefords in England at the present time, are W. F. Hobbs, John and William Hewer, Lord Talbot, Sir H. Hoskins, S. Aston and Sir Francis Lawley. In reference to the stock of the two last mentioned breeders, Mr. Smythies, in the *Mark-Lane Express* of February 5 last, makes the following challenge, in order to test the relative merits of the Shorthorns, Devons and Hereford:

"I will show one hundred Hereford beasts, which were the property of Sir Francis Lawley, Bart., on the 1st of January, 1849, and the same number, which were the property of Mr. Aston, of Lynch Court, on the same day, against an equal number, the property of any two breeders of Shorthorns or Devons, in any part of Great Britain, on the same day, for one hundred sovereigns. I am willing to leave the decision to the three judges at the last Smithfield show, two of whom are unknown to me even by sight."

Mr. S. also makes the following offer:

"I am also ready to place four Hereford calves, on the first of May next, in the hands of any respectable grazier in the midland counties, against four Short Horns and four Devons; no calf to be more than four months old on that day; the twelve calves to be turned to grass together; to have nothing but grass till the 20th October following, then to be put into stalls and to be fed as the grazier thinks proper; but the food to be weighed to each lot till the following May, when they shall be again turned to grass, and shall have nothing but what they get there, till the first October, then to be again taken into the stalls, and the food weighed as before; the whole to be shown as extra stock at the Smithfield show, at the bazaar, and after the show, to be slaughtered, the four beasts that pay the best to be the winners."

The predominant characteristic of the Hereford breed of cattle is a disposition to fatten.

In a paper by E. F. Wells, published in the Farmers' Magazine for February, 1848, the following sensible remarks are made in regard to the properties of Herefords:

"It is allowed on all hands, I believe, that the properties in which Herefords stand pre-eminent among the middle size breeds, are in the production of oxen, and their superiority of flesh. On these points there is little chance of their being excelled. It should, however, be borne in mind that the best oxen are not produced from the largest cows, nor is a superior quality of flesh, such as is considered very soft to the touch with their skin. It is the union of these two qualities which often characterizes the Short Horns, but the Hereford breeders should endeavor to maintain a higher standard of excellence, that for which the best of the breed have always been esteemed, a moderately thick, mellow hide, with a well apportioned combination of softness with elasticity. A sufficiency of hair is also desirable, and if accompanied with a disposition to curl moderately, it is more in esteem, but that which has a harsh and wiry feeling, is objectionable."

It is for the beef chiefly, that they, as well as the "Herd Book" Short Horns, are bred in England. In dairy properties, the Herefords are believed equal to any high-bred breed, all breeds being doubtless inferior to some others, in which the milking property has received more attention in breeding.

The show of fat cattle by the Smithfield Club, London, is the only exhibition of note in Britain, where the different breeds are brought into direct competition with each other. Here the Herefords and Short Horns have long been rivals, and have contested with various success. In looking over most of the results for a period of thirty-nine years, we think it may be assumed that in the classes for oxen and steers, the Herefords have taken more prizes than any other breed. For the prizes on fat cows, they have been less successful than the Short Horns.

As an example of the success of a single competitor at Smithfield, it may not be amiss to mention that Mr. Westcar, above mentioned, took the first prize in class I, (oxen) in 1810, 1812, 1813, 1814 and 1815. The animals in every case were Herefords. The dead weights of the first four were as follows: Quarters, hide and loose tallow included, 2147, 2059, 1953 and 2141 pounds. We have not the weight of the fifth. Mr. Smythies states that Mr. Westcar sold, at different times, twenty Hereford oxen, at two thousand, one hundred and fifty pounds. The statement was proved by an extract from Mr. Westcar's books, giving the date of sale, the name of the butcher they were sold to and the several sums paid for them. Six of them, it is said, were sold in one deal to Mr. Giblet of Bond street, for six hundred pounds. The beef of the Herefords is of fine quality, and commands a price in the English markets equal to any, except that of the Highland Scotch. The following extract from a late number of the Agricultural Gazette, giving the price current at the Smithfield market, shows about the usual range, per stone of eight pounds:

	S.	D.		S.	D.
Best Scots, Herefords, etc.	4	4	to	4	8
Best Short Horns	4	2	to	4	6

Youatt says: "There are few cattle more prized in the market than the genuine Herefords." In respect to size, they rank next to the Short Horns. The writer just referred to, observes: "They fatten to a much greater weight than the Devons, and run from 50 to 70 score, (1,000 to 1,400 lbs.) the four quarters. A tolerable cow will average 35 to 50 score, (700 to 1,000 lbs.) The hide is considerably thicker than that of the Devons, and the beasts are more hardy, compared with the Devons; they are shorter in the legs and also in the carcass, higher and broader, and heavier in the chine, rounder and wider across the hips, and better covered with fat, the thigh fuller and more muscular, and the shoulders larger and coarser."

The latter remark may be true as to the two breeds in general, but most of the Herefords we have seen, have not been coarse in the shoulder.

There have been comparatively but few importations of Hereford's to America. The principal one, and that from which the breed has been chiefly disseminated through the country, was that of Messrs. Corning & Lotham, consisting of five bulls and seventeen cows and heifers, imported in 1840. These were mostly from the herds of Mr. J. Hewer and Mr. Walker. Mr. C. N. Bement purchased a bull and heifer in 1839. The bull died shortly after, and the cow and her increase were added to the first mentioned herd. Hon. H. Clay, of Kentucky, imported two bulls and two heifers, of this breed, in 1817. We do not know who was the breeder of this stock, or whether they were of the most esteemed families of Herefords.

In an account of them, written by Mr. Clay, published in the *American Farmer,* 1822, he states that the price paid in England for the four was £105 sterling. From this we should infer that they were not from a herd of the highest repute. He states that one of the bulls died on his journey from Baltimore to Kentucky. We have understood that the increase from these animals was not large. In 1824, Admiral Coffin, of the Royal Navy, presented to the Massachusetts Society for Promoting Agriculture, a Hereford bull and heifer. They were bred by Sir J. G. Cotterell, whose stock was from Mr. Yarworth, and his from Mr. Benj. Tomkins, the first noted breeder of Herefords. The cow never bred. The bull was kept several years by the late Hon. Isaac C. Bates, of Northampton, Mass., and left a valuable progeny.

Besides the above importations, we are informed that Mordecai Hale, Esq., sent some Herefords to Steuben county, N. Y., many years ago. We have no particulars in regard to their importation. (See remarks of Judge Leland, in the *Cultivator* for 1845.) (Several years ago, Mordecai Hale, Esq., who was in some way connected with the U. S. Navy, sent some Herefords into that country; and perhaps he ought, in justice to the advocates of Herefords, to say that they proved the most generally useful of any stock they had tried. They were very hardy, were powerful in the yoke, and a decided improvement on the native stock for the dairy.)

As to the success of the Herefords in this country, we believe they have given general satisfaction to those who have given them a fair trial. They have good constitutions, thrive readily, and are more active than any other cattle of so large a size. But few of the full blood have, as yet been fattened or worked. The half bloods show a decided superiority over the common stock of the country for these purposes. In respect to dairy properties, we think they have, as compared with other breeds, especially "Herd Book" Short Horns, proved better here than some anticipated.

From what we have seen, we think it would not be difficult to breed good dairy stock from Herefords; though it is probable, that the development of their dairy qualities, would be, to some extent, a sacrifice of the disposition to fatten. We know that good dairy cows are met with in this breed. Their milk is generally rich, and like that of the Devons, quite a large proportion of the best of butter.

In 1839, the Royal Agricultural Society offered a prize of fifteen sovereigns for the cow "best calculated for dairy purposes," the competition being open to all breeds in the Kingdom. This prize was taken by the Rev. J. R. Smythies, for a Hereford; the second prize was awarded to a Short Horn. Several other Herefords were entered for this prize, a circumstance which proves that cows were to be had of this breed, in the dairy qualities of which, their owners had such confidence, as to show them against any others. This was the only occasion on which the Royal Society has brought the different breeds into competition with each other—the class having been from the time abolished.

Mr. Smythies, in a late communication in the Mark Lane Express, before referred to, says: "I have seen Hereford cows milk well, and had one myself which made eleven pounds of butter a week for three months." This may have been the cow on which he received the above mentioned prize, though this is not stated. But he observes that beef is much more profitable in his section than dairy products, and on this account, it is not an object of a Hereford breeder to have good milkers.

The milking property in cattle undoubtedly depends on the object and skill of the breeder. The late John Price, in a communication published in the Farmers' Magazine for January, 1841, observes: "Experience has taught me that no animals possessing form and other requisites, giving them a great disposition to fatten, are calculated to give much milk, nor is it reasonable to suppose they should; it would be in direct opposition to the law of nature. Had I willed it twenty years ago, my belief is, that I could by this time have bred twenty cows, purely from my own herd (Herefords), which should have given a sufficient quantity of milk for (paying) dairy purposes, and I am equally confident that, in the same period I could have bred a similar number, that would not at any time have given twenty quarts of milk per day among them. I feel confident that I could effect either of these objects much more easily and certainly, than I could blend the two properties in the same animal, retaining also the form and quality best adapted to live hard and feed (fatten)."

But it is not to be expected that the Herefords, or any other breed of cattle, will take the place of all other breeds in all situations. On this point the observation of C. Hilliard, in his "Practical Farming and Grazing," is worthy of notice. There are four different breeds of cattle that are for different soils, situations and purposes, superior to any other cattle in the world. The Durhams, (or as they are commonly called, the improved Short Horns) and the Hereford, for the best pastures; the North Devon for the short pasture on warm, light soils, and the Scots for the wild and cold pasturage. These four breeds of cattle will ever remain pure, because it is thought that they cannot be permanently benefited by crossing with any other breed.

CHALLENGE.

Rev. J. R. Smithies, a noted breeder of Hereford cattle, makes the following offer, through the Mark Lane Express:

"I hereby offer to show four Hereford steers, whose ages shall not exceed two years and three months, and four whose ages shall not exceed one year and three months, at the next Smithfield show in December, against eight Short Horns and eight Devons, of similar ages, for a sweepstakes of one hundred sovereigns for each lot, with this stipulation: That each lot shall have been bred by one man, and that they shall have been at grass at least four months this summer, without having had anything but what they got there. But this is not all. I am willing to test their hardiness as a breeding stock, as well as their feeding properties. In order to do this, I propose to turn my two year old heifer, which gained the first prize at Norwich, into a pasture with the two year old Short Horn and two year old Devon heifer, which obtained the first prize in their respective classes, and let them remain there till the next meeting of the Royal English Agricultural Society at Exeter, next July, giving them nothing but what they can get, except a little hay from the 5th of November till the 5th of May; the heifers to be shown at Exeter for a sweepstakes of a hundred sovereigns each. But in case the owners of either of the heifers should object to the amount of the stake, I am ready to show them for nothing, if the society will consent to give a cup to the winner; and I do not know how they could lay out their money better, for this a question of the utmost importance, and one that ought to be decided as early as possible, and can only be settled by the animals being brought into close contact in the way I propose. If any Short Horn or Devon breeder can point out a fairer way of testing their respective merits than the one I have proposed, I shall be ready to meet him in anyway he likes. I am not nice, to a shade, how the experiment is tried, so that the animals are brought fairly into competition with each other. I hereby declare that I am ready at all times to produce Hereford beasts against any other breed in the United Kingdom, either as rearing or feeding stock, and to back my opinion."

We copy the following from the encyclopœdia, published by the society for the diffusion of useful knowledge, Vol. XII, article Herefordshire, as an accurate account of the general qualities of the breed:

"The general breed of cattle is that for which this country has been justly celebrated; their color is red, with white or mottled faces, and frequently white along the back and about the legs. Good milkers are occasionally found among the cows, and it is possible that a race might be reared from this stock that would be useful for the pail, but dairy farming is never practiced here, and the milk of the cows, which are kept only for breeding, is given to the calves. It was formerly the custom to work the oxen at three or four years old, and to feed and send them them to market at five; but there is now a complete change of system. The oxen are no longer worked, but are commonly fed when they are two years old, and sent to market before they are three. Their early maturity and the readiness with which they fatten, make them suited for this system of farming. Graziers from the south and the middle of England drive a large number of this popular stock from the Hereford Candlemas and October fairs."

The Hereford ox feeds more readily than the Devon, and in proportion to the quantity of food consumed, lays on a greater weight of flesh than a Durham ox. The result of a trial of this kind may be seen at page 34 of Youatt's Cattle. That the flesh of the Hereford is of a finer quality than the Durhams, is proved by the superior price per stone which it obtains in the Smithfield market.

We find in the London Farmers' Magazine for December, a challenge from John Price, Esq., of Poole House, Upton-on-Severn, "To all breeders of cattle in England," in which he says: "I am willing to show at any time before the end of the month next ensuing, for any sum not exceeding £100 nor less than £25, a bull and twenty regular breeding, in calf, cows, (Herefords) all bred by myself, against any bull and a similar number of cows of any sort that have been bred by, and are now in the possession of, any breeder of cattle in the United Kingdom."

From a letter to Mr. Price, in reply to this challenge, by Thomas Bates, Esq., of Kirkleavington, we make the following extract. Mr. Bates says:

"I write to say that on principle, I can not be induced to gamble, but if your object be the investigation of the merits of different breeds of cattle, etc., I am ready to meet such investigation, and show you my herd of Short Horns, and to any others who you may bring with you for that purpose, and shall then accompany them and you to view your herd of Herefords. Such investigations may prove of the greatest benefit, not only to those who make them, but their report, candidly written down, and inserted in any public documents, may have the most beneficial effect for the public benefit. I visited Hereford above fifty years ago, and was then, and continue still, an admirer of the best variety of cattle, (Herefords.) But I consider now, and have for above forty years been convinced, that the very best Short Horns—which are only a few—are capable of improving all other breeds of cattle in the United Kingdom, as well as the ordinary Short Horns, which are far from a good breed, and inferior to the Herefords, Devons and others. I have at present two red twin year old bulls out of the dam of Duke of Northumberland, which, on inspection, you may not think unworthy to be put to your herd of Herefords for one season, to give you an opportunity of testing the merits of this cross-breed. In my opinion, they would prove an invaluable cross with the best Herefords, increase the growth of the Herefords, and at an earlier age be fit for the butcher, with a less consumption of food, and quality of beef unimpaired, and also give that breed an increased milking quality—both in quantity of milk and richness, yielding more butter."

Mr. Price replies to Mr. Bates, that the bad state of his health prevented his accepting his invitation to visit him, and adds: "I have myself tried many crosses in breeding, both cattle and sheep, and have witnessed the result of such trials made by others, all of which have signally failed where the object has been to obtain more size and weight by using large male animals with females of smaller dimensions. I stated that I had formerly seen what were then considered to be the best sort of Short Horns in existence, and latterly among others, those of Lord Spencer, with whom I had the pleasure to spend a few days at Wiseton three years ago, yet that I had never seen anything to shake my belief that Hereford cattle would pay more money for the food they consumed than any other breed with which I was acquainted. My desire has long been, and still is, to endeavor by all practical means to ascertain which is the best description of cattle for both breeder and feeder, that is, which sort will pay the most money for the food they consume. I have repeatedly made public my willingness to find cattle to test this point with other sorts in the way I think best, viz.: By keeping together and feeding in the way usually adopted by graziers, some animals of each breed, with this proviso, that the quantity of food consumed by each sort should be as nearly as possible ascertained."

In reply to this Mr. Bates says that "whenever Mr. Price's health admits of it, if he will state why, on the true principles of breeding, it is wrong to breed from a large male and a small female, I am ready to meet him and prove the contrary by incontrovertible facts."

JERSEY CATTLE.

The Channel Islands are situated between the northwest coast of France and the southeast coast of England, in the Atlantic ocean, and are known as Alderney, Jersey, Guernsey and Sark. The first named is a small islet upon which reside the government officers of the island group, and, although, for a long period all the cattle exported from the Channel Islands were known as Alderneys, very few cattle are bred there, the people being quite extensively engaged in trade, unlike those of Jersey and Guernsey, where agriculture is the principal pursuit. The cattle of Alderney belong to a mixed race, the descendants of animals imported from Jersey and Guernsey for dairy purposes, and while in all general characteristics they are identical with those of the other islands, they lack the essential points of form and quality, which long and careful breeding have given to those of Jersey.

JERSEY

Is the largest of the Channel Islands, situated about sixteen miles from the coast of Britany, eleven miles long, seven and a half miles wide, and containing an area of about forty thousand acres. Its climate is mild and equable, its soil fertile. Upon this little island, in addition to other needful animals, eleven thousand Jersey cattle are kept for use and exportation. The farms are small, the land owners numbering some two thousand, and each breeder of cattle maintains only a few choice animals, to which he gives unusual care and attention. The export of cattle is confined principally to England and the United States, but so well established is the reputation of the Jersey cow, that many dairies in Germany and other more remote countries of continental Europe are supplied with choice specimens of the breed.

THE ORIGIN OF THE JERSEY COW.

The progenitors of the Jersey cattle are supposed to have been brought over from the neighboring coast of Britany and Normandy during the French possession of the islands. Although there is no positive evidence of this fact, when we consider the proximity of the French coast and the resemblance in color and other characteristics between the island cattle and those of the main land, there can be little doubt upon the subject. The Jersey cow of to-day is undoubtedly much superior in every respect to that of Normandy and Britany; it is, in fact, customary with enterprising breeders on the west coast of France to use Jersey bulls for the improvement of their native stock;

but the difference in favor of the former is mainly owing to the constant and unremitting attention given to the improvement of the stock of the island by those, who discovering at an early day, their peculiar merit as butter producers, found it to their interest to develop this characteristic by every means at their command. Recognizing the fact that the Jersey cow was the superior in her production of a first-rate quality of butter to other breeds of cows used for dairy purposes, the Colonial Legislature of Jersey, as early as 1789, passed a law prohibiting the importation onto the island of any foreign cow, bull or calf, except for the purpose of butchering. Severe penalties were attached to transgressions against this law, and the consequence has been that the Jersey breed has been maintained in all its purity for the past ninety years, and the Jersey cow, under the fostering care of the Royal Jersey Agricultural Society, has attained a position in the estimation of butter-makers, which leaves her almost without a rival.

AMERICAN IMPORTATIONS.

The merit of Jersey cattle was known and recognized in the United States long before any importations were made of sufficient moment to exert any influence upon our native stock of cattle. The first importations which attracted attention were those of Tambor and Norton of Connecticut, in 1850. The merit of the animals imported by those gentlemen was such that, down to this day, careful breeders of Jersey cattle seek with some pains for stock, the pedigrees of which can be traced back to some one or another of the famous old cows owned by Tambor or Norton. In the vicinity of Baltimore, where the breeding of fine Jerseys has been followed for many years past by gentlemen of means and enterprise, almost every animal, not of very recent importation, traces back to this 1850 importation, and it would be difficult to discover anywhere a more uniformly good lot of Jersey cattle than is to be found in the locality referred to. Of late years, Jersey cattle have been brought over to the United States in large numbers. Mr. Motley of Massachusetts, and Mr. Colt of Hartford, Connecticut, the Messrs. Chanpless of Pennsylvania, Mr. Dinsmore of New York, and many others in the East, have figured as importers from year to year, while, more recently, Messrs. Kirkman and Brown of Tennessee, and Churchman and Jackson of Indianapolis, have entered the list among Western breeders—being the owners of some fine imported stock selected for them on the Island by Col. Waring, Secretary of the American Jersey Cattle Club. The animals imported at a very early age, being rarely over two years old, are selected according to a certain scale of points which, to say the least of it, is frequently deceptive. Consequently, a very large proportion of them, when put to the test, disappoint the expectations of their purchasers. Whatever may be said to the contrary, the best evidence of of quality in the cow is the actual test at the pail or churn; and if we must buy a calf, the best basis for the expectation of merit is the knowledge that her immediate ancestors excelled in the qualities for which we seek. With the great demand for Jersey cattle, due largely to their actual excellence, but somewhat, also, to a judicious system of advertising, numbers of importers and dealers have gone into the business for the sole purpose of coining money out of the ignorance of those beginning as breeders. That one Jersey cow is not as good as another—that in fact some Jersey cows are good for nothing at all—should be borne in mind by the inexperienced purchaser; and more especially should it be remembered that the Island of Jersey has been culled for the past thirty years by buyers from England and America, who, with well-filled purses, have sought for the best animals to be had, regardless of price—and that consequently there *should* be a great many very good Jersey cattle in this country, while there *may* be a great many very poor ones on the island. Attention is called to these facts simply in the interest of those who are disposed to attach undue importance to the brand of importation, and who are led to pay extravagant prices for an imported animal much inferior, possibly, to a home-bred one, to be obtained with less trouble and at less cost. It is well, also, to note that when the beginner makes his purchases from well-established and acclimated herds in this country, he has the opportunity to examine into the butter records of the animals he selects—he can examine their immediate ancestry, and he can thus form some idea at least of the quality of the stock he buys. When he invests with the importer, all he positively secures is purity of blood and the brand of importation, all the rest being left to chance. The two Fowlers, one of the Island of Jersey and the other of England, were the only regular importers of Jerseys and Guernseys, until recently. They import from fifteen to twenty head every few months, and hold their sales, sometimes in New York, sometimes in Philadelphia, and occasionally in Boston and Cincinnati. A new importing association will hereafter compete with the Fowlers, who have long had the field entirely to themselves. "The Ogden Farm Association," under the management of Messrs. Geo. E. Waring, Jr., Sidney F. Tyler and Thos. I. Hand, has entered the lists, and it is fair to presume that the importation of Jersey cattle will be greatly stimulated by the enterprise of these gentlemen.

THE AMERICAN JERSEY CATTLE CLUB.

The breeding of Jersey cattle in 1870 had come to be a great and growing interest in the United States. Prior to this time, an organization of New England breeders had published what was known as the American Herd Book of Jersey Cattle, and in this publication all the *recorded* pedigrees of Jersey cattle in the States were found. The scope of the New England herd book was too limited, and many of the best cattle in the country had never been recorded in its columns. To more thoroughly accomplish the desired end—which was to secure for the breeders of the country a reliable, unbiased and unsectional record for the pedigrees of all the undoubtedly pure-bred Jerseys in the country—an organization of gentlemen was effected in the spring of 1870, which, under the name of the *American Jersey Cattle Club*, elected a complement of officers, and proceeded to publish a herd-book, five volumes of which have appeared up to date, recording the pedigrees of 2,700 bulls and 6,000 cows, imported and home-bred. The Jersey Cattle Club is composed of a majority of the most reliable breeders in all the States and Canada, and so well is the entrance to its herd register hedged against fraud, that an animal entered may be said with absolute certainty to be of pure Jersey blood. The register undertakes only to indicate the exact line of breeding of the animal entered in it, and does not pass upon its merits in other respects. There may be very many very excellent Jersey cattle not entered it, in consequence of some informality in their pedigree, but as a pure and simple register of pure-bred Jersey cattle, there is no more reliable guide published in the States. A volume of the register is published each year, under the supervision of the Secretary, Col. Geo. E. Waring, Jr., of Newport, Rhode Island. The entry charge for pedigrees is $1.00 for members, and $3.00 for non-members; transfers are made at a cost of twenty-five cents for publication. Any breeder may become a member of the Club upon receiving the requisite number of votes, or the recommendation of any one member willing to certify that he is a "reliable breeder," and upon the payment, as intiation fee, of $1.00.

POINTS IN JERSEYS.

The Royal Agricultural Society of Jersey in awarding premiums at their local fairs, fixed upon a scale of points which has been somewhat amended of late years, as follows:

Article.	Bulls.	Points.
1	Head fine and tapering	1
2	Forehead broad	1
3	Cheek small	1
4	Throat clean	1
5	Muzzle fine, and encircled by a light color	1
6	Nostrils high and open	1
7	Horns smooth, crumpled, not too thick at the base, and tapering, tipped with black	1
8	Ears small and thin	1
9	Ears of a deep orange color within	1
10	Eyes full and lively	1
11	Neck arched, powerful, but not too coarse and heavy	1
12	Chest broad and deep	1
13	Barrel hooped, broad and deep	1
14	Well ribbed ham, having but little space between the last rib and the hip	1
15	Back straight from the withers to the top of the hip	1
16	Back straight from the top of the hip to the setting in of the tail, and the tail at right angles with the back	1
17	Tail fine	1
18	Tail hanging down to the hocks	1
19	Hide mellow and moveable, but not too loose	1
20	Hide covered with fine, soft hair	1
21	Hide of good color	1
22	Fore legs short and straight	1
23	Fore-arm large and powerful, swelling and full above the knee and fine below it	1
24	Hind quarters from the hock to the point of the rump, long and well filled up	1
25	Hind legs, short and straight (below the hocks) and bones rather fine	1
26	Hind legs squarely placed and not too near together, when viewed from behind	1
27	Hind legs not to cross in walking	1
28	Hoofs small	1
29	Growth	1
30	General appearance	1
31	Condition	1
	Perfection	31

No prize shall be awarded to bulls having less than 25 points. Bulls having 23 points may be branded, but cannot take prize.

The scale of points for cows and heifers is as follows:

Article.		Points.
1	Head, small, fine and tapering	1
2	Cheek small	1
3	Throat clean	1
4	Muzzle fine and encircled by a light color	1
5	Nostrils high and open	1
6	Horns smooth, crumpled, not too thick at the base and tapering	1
7	Ears small and thin	1
8	Ears of a deep orange color within	1
9	Eye full and placid	1
10	Neck straight, fine and placed lightly on the shoulders	1
11	Chest broad and deep	1
12	Barrel hooped, broad and deep	1
13	Well ribbed ham, having but little space between the last rib and the hip	1
14	Back straight from the withers to the top of the hip	1
15	Back straight from the top of the hip to the setting in of the tail and the tail at right angles with the back	1
16	Tail fine	1
17	Tail hanging down to the hocks	1
18	Hide thin and moveable, but not too loose	1
19	Hide covered with fine, soft hair	1
20	Hide of good color	1
21	Fore-legs, short, straight and fine	1
22	Fore-arm swelling and full above the knee	1
23	Hind quarters from the hock to the point of rump long and well filled up	1
24	Hind legs short and straight (below the hocks), and bones rather fine	1
25	Hind legs squarely placed, not too close together when viewed from behind	1
26	Hind legs not too close in walking	1
27	Hoofs small	1
28	Udder full in form, well in line with belly	1
29	Udder well up behind	1
30	Teats large and squarely placed; behind wide apart	1
31	Milk veins very prominent	1
32	Growth	1
33	General appearance	1
34	Condition	1
	Perfection	34

No prizes awarded cows with less than 29 points. No prizes awarded heifers with less than 26 points. Three points—28, 29, 31—deducted from the number required for perfection in heifers, as their udder and milk-veins cannot be fully developed—a heifer will therefore be considered perfect with 31 points.

The reader will observe that in the scale of points for cows and heifers, the udder, teats and milk veins are placed upon a level, in the scale of merit which goes to indicate perfection with the legs, tail, hoofs, etc. In fact it would almost appear that the looseness, color and covering of the hide were of more importance than the fullness and soundness of the udder, as the former qualities are awarded three points in the scale, and the latter only two. The gentlemen composing the American Jersey Cattle Club are intelligent and practical, and no sooner was this organization effected than it became apparent to them that something must be done to so amend the Jersy scale of points, as to give prominences to the essential qualities for which the animals were bred in the scale. The result of their deliberation was the following scale of 100 points for cows adopted by the club *for cows* in 1875, in which it will be observed that all those points which indicate dairy merit are awarded from three to eight counts, while those bearing upon unimportant features in the make-up of the animal, are reduced to the minimum of one.

Points.	Scale of Points for Cows.	Counts.
1	Head small, lean, and rather long	2
2	Face dished, broad between the eyes, and narrow between the horns	1
3	Muzzle dark, and encircled by a light color	1
4	Eyes full and placid	1
5	Horns small, crumpled and amber color	3
6	Ears small and thin	1
7	Neck straight, thin, rather long, with clean throat and not heavy at the shoulders	4
8	Shoulders sloping and clean, withers, thin, breast neither deficient nor beefy	3
9	Back level, to the setting in of the tail, and broad across the loins	4
10	Barrel hooped, broad and deep at the flank	8
11	Hips wide apart, and fine in the bone, rump long and broad	4
12	Thighs long, thin and wide apart, with legs standing square and not to cross in walking	4
13	Leg short, small below the knees, with small hoofs	3
14	Tail fine, reaching the hocks, with good switch	3
15	Hide thin and mellow, with fine soft hair	4

16	Color of hide when the hair is white, on udder and inside of ears, yellow	5
17	Fore udder full in form and running well forward	8
18	Hind udder full in form and well up behind	8
19	Udder free from long hair and not fleshy	5
20	Teats rather large, wide apart and squarely placed	6
21	Milk veins prominent	5
22	Escutcheon high and broad and full on thighs	8
23	Disposition quiet and good natured	3
24	General apperance rather bony than fleshy,	6
	Perfection	100

In judging heifers omit Nos. 17, 18 and 21. The same scale of points shall be used in judging bulls, omitting Nos. 17, 18, 19 and 21, and making moderate allowance for masculinity.

This scale although apparently meeting every requirement of a perfect one, has met with no little opposition from individual breeders. In fact there are some gentlemen, who,with show of reason denounced the scale system altogether as being deceptive, and irrational. The ladies argue with earnestness that the only valuable test of the merit of a Jersey cow, is the comparative one at the pail and churn, and are urgent in their recommendation that competitive exhibitions of Jersey cows be held at stated periods, where entries can be made and results published, after all the competing animals have been submitted to the same treatment under one management. Others again assert that the escutcheon theory holds too high a place in the scale, that the Guenon idea is after all merely an idea, and that even suppose that all the distinguished Frenchman asserts be true, he only claims by his system to indicate the length and quantity of the milk flow, and says nothing as to its quality. As the Jersey cow lays claim to being *par-excellence* a rich milker, it would seem that the Guenon theory fails in an essential particular, when consulted in her case. These are matters which must be determined in the near future, as skillful and inteligent men are bringing their minds to bear upon them. Assuredly so far as the escutcheon theory is concerned, there seems to be much room for difference of opinion, for it is a well known fact that many cows among the beef breeds, utterly useless as producers of milk and butter, are supplied with milk-resorvoirs, which would please the eye of the most enthuiastic admirers of the Guenon system.

CONSTITUTION, BREEDING QUALITIES, ETC.

The writer of this article has been engaged in the breeding of Jersey cattle for the past twelve or thirteen years, and whatever is stated concerning them, is based upon actual experience. It was customary at one time to consider the Jersey cow as the rich man's pet—the producer of a cup full of rich milk to supply the luxurious demand of the rich man's table—and to hold her as worthless when brought into competition with larger and better known breeds. Of late years, this idea has given way before the practical tests of her quality. While seeking no place among the beef-producing breeds of the country, the Jersey claims merit only as a dairy cow *par excellence.* In constitution she is hardy, and stands the extremes of heat and cold with equal courage. It has been the custom of the writer to feed his milking cows on a liberal supply of bran and well-cured hay, in winter turning them out, no matter what the weather might be, to seek cover under sheds, while mature animals, not in milk, live the winter through on hay alone, coming out in spring healthy and in good condition. He has yet to lose his first animal from exposure, or from disease, other than milk fever, which is as liable to prove fatal to good milkers of one breed as another. Jersey cows breed early, and with vast regularity. It is not unusual to see them with calves at their side when fourteen or fifteen months old, and in one instance a cow was exhibited, at the St. Louis Fair, eleven months old, with her calf in thriving condition. She must have received the male when only two months old. They breed regularly for from fifteen to eighteen years, dropping often two calves within a period of twelve months. The Centennial prize cow, *Niobe*, was eighteen years old and in calf, when exhibited at Philadelphia in 1876.

JERSEY COLORS.

The color of the hair on Jerseys has been the subject of much debate—sometimes of a character quite acrimonious between those holding different opinions upon the subject. Jerseys are of nearly all colors common to cattle—black, gray, fawn, light red, and shire colors, variously mixed with white. They are rarely, if ever, white, dark red or brindle, but color, outside of the three last named shades, is of no importance in determining quality or purity of blood. In England, for many years past, Jersey cattle have been held in high esteem, and a mania for those of a solid gray or fawn color has sprung up, which has given fictitious value to them. It is not claimed that cattle of this shade of color are any purer of blood or better at the pail than those of other colors, but the desire to secure animals which will add beauty to the landscape as lawn cattle, is at the bottom of the fashion. The same idea has gained some place among American breeders, but few of them carry it to the same extent as do their English cousins. It is proper and commendable, in perfecting our herds of one kind or another, to strive for uniformity of appearance as well as excellence. Certainly, Southdown sheep, or Berkshire hogs, or Devon cattle are no worse for breeding uniformally as to color as well as to other things. The breeder who, in forming a herd of Jerseys, consults his taste for certain colors, while demanding excellence in the dairy, is guilty of no lack of judgment. Should he lose sight, however, entirely of the qualities for which every good dairy cow is prized, and simply gratify his eye for the beautiful, he would commit a grave mistake, which he would have cause, sooner or later, to regret. Those who argue that a proper appreciation of uniformity of color in the herd is inconsistent with the honest pursuit of pure dairy merit, are quite as much in the category of extremists as those who only consider the color of the hair or tongue or switch, in the selection of a Jersey cow. We seek, in our selections, to reach perfection as laid down by the scale of points—a long and fine tail, a small crumpling horn, a small hoof, etc., are requisites according to the scale. These points are certainly of little importance. If, however, a purchaser, after securing dairy quality, should insist upon the horns and tails and hoofs coming up to the standard, he would not certainly be considered as acting in an injudicious or unreasonable manner. The same reasoning may be applied to this question of color.

DISPOSITION.

Jersey cows are proverbially gentle and kind. With their first calves they usually act like matrons, and stand to the milker without giving trouble. Much depends, of course, upon their early treatment. If banged about by harsh and ill-tempered handlers, they will resent such treatment when the proper time comes, but in this respect they do not differ materially from other breeds. The bulls have not so good a reputation in this regard as the cows. After two or three years of age, they are not unfrequently breachy and vicious, and in most instances it is safer to confine them to a lot, where they may consume their fretful fires against a substantial fence, without risk of tossing unoffending passers-by. This disposition to roam, without apparent aim, is owing somewhat to their being light and active. In many instances, however, they remain quietly within an ordinary enclosure, so long as a sufficient number of cows are allowed to keep them company. The constant coming and going of the neighbor's cows has much to do with their tendency to breachiness.

COMPARATIVE JERSEY YIELDS—BUTTER RECORDS.

The Jersey cow rests her claim for favor with the public upon her reputed ability to produce more butter and better butter, for the amount of food consumed, than the cows of any other breed. It is not enough to say that a certain cow, of one breed or another, made, under certain advantageous circumstances, so many pounds of butter in a day, or a week, or a month, but the idea is to ascertain what breed of cows will, on an average, produce the greatest amount of the best butter annually, at the smallest cost. Some years since, the writer communicated with several prominent breeders of Jerseys, in quest of information bearing upon this point, and, while the answers are not entirely satisfactory as to details, those of Col. Geo. E. Waring, Jr. and Thos. I. Hand, Secretary and Treasurer of the American Jersey Cattle Club, are given as they were received. Col. Waring says: "Jersey (or any other) cows, that give 18 pounds of butter per week, are about as scarce as hen's teeth. Fourteen is not unknown, but it is extraordinary. I should say that a really good herd should average 10 pounds at their flush. Their great point is the persistency with which they hold out. From a good herd of rather undersized cows, 250 pounds may be made in a year, and this is very large." Mr. Hand wrote at same time: "Some of my cows at their best, in choice pasture, might make from twelve to fourteen pounds per week. I don't believe there is a Jersey in the country will make 18 pounds. Any one having such a cow can get $1,000 for her, and I think I can promise $2,000 for a 20 pound cow. I will give what we did from September 1, 1871 to September 1, 1872. The herd consisted of:

Two heifers, with first calves	4	months'	milking
Lady Mary, aged	12	"	dry period.
Lady Ella, aged	12	"	" "
Hazel, after second calf	9	"	milking
Velvet, before and after second calf	8	"	"
Grade, ½ Jersey	2	"	"
Two Ayrshires	4	"	"

A little less than equal to 6 cows for 10 months.

Calves are fed on fresh milk for about 10 days. I have made no deduction for this; and then for another week fresh and skimmed milk mixed, diminishing the former and increasing the latter, until only skimmed is given. Besides this, we use at least one quart of cream daily in the family, which is fully the equivalent of one pound of butter per day. After allowing for these serious leaks, we churned during the year 1592 pounds, and sold $965 worth, consuming the rest. The price price ranged from 55 cents to 80 cents, the greater portion in winter bringing 75 cents. During one week (cold weather) last December (1872), from five cows, which had calved middle of June, 4th of July, 1st of September, 28th of November, (one a grade) we churned thirty-six pounds, to which our daily quart of cream would have added seven pounds. On grass, my cows get nothing else, unless the pasture gets thin, when I give some bran or corn-fodder. In winter I feed chopped hay, bran and a little corn meal scalded twelve hours before feeding, with beets in the middle of the day. I cannot give you the measure of milk, as we do not keep an account of it. Velvet gave last winter, after her third calf, seventeen quarts. She is a small cow and now, six months after calving, looks like a fresh cow in her show of udder."

The following statements of the yields of various cows are collated from various reliable sources, and are generally accompanied with the certificates of those owning the animals; (while this method of getting at facts is open to serious objections, it is the only one at present at our command.) "E. S. Ming, of Fowler, N. Y., has a grade Jersey heifer, two years old, from the milk of which, for two days October 19 and 20, ('78) were made 2 pounds and 1 ounce of butter. October 24 she gave 16 pounds of milk, from which was made 1 pound of butter; all this from green feed only."

Alice, owned by Mr. N. D. M., of Edgefield, Tennessee, is out of a native cow by an unregistered Jersey bull, bred by Mr. Alexander, of Kentucky. She is small even for a Jersey, and is now seven years old. She calved May 30, 1876, and did not calve again until November 26, 1877. During the months of May, June, July and August, her usual daily yield of milk was four gallons. The family used same; the cream from eighteen gallons a week was churned, and its usual yield was ten pounds of butter. Her weekly yield was then at the rate of over fifteen and half pounds of butter per week. She is now due to calve about January 5, 1879, and is giving one and one-half gallons per day, and this amount yields one pound of butter. These facts are vouched for to the writer by the owner, a gentleman in every way worthy of the highest credit."

Jonathan Smith, of Jersey, thus writes to the Jersey Bulletin, of a small herd of Jerseys belonging to Thomas Falla, Sr., and located on his island farm: "From the four cows, Brown Fanny, Cherry, Dairymaid and Cowslip, (and Pretty Maid sold Nov. 1, 1877,) Mr. Falla sold in 1874, 1,187 Jersey pounds of butter, (= 1,298 pounds, U. S.,) besides providing his family with new milk and butter—that is an average of five pounds sold per week for each head of cattle for the whole year. If we add to the above total 2½ pounds per week for the milk and butter used in the family, it brings the average up to 5½ pounds per head per week.

"In 1875 the produce was a little better, the total amount of butter sold being 1,359 Jersey pounds, (= 1,486 pounds, U. S.,) giving an average of 297 pounds per head for the year, or nearly 5¼ pounds per week. If 2½ pounds per week be allowed for family use, it will make the average for 1875, 5¾ pounds per week per head for the whole year

"In 1876 the produce was still better, the butter sold being 1,398 Jersey pounds, (= 1,529 pounds, U. S.,) giving an average for the whole herd for the year, of 306 pounds; per week nearly 6 pounds. *This was butter actually sold.* If we allow, as before, for family use, it brings the average up 8,332 pounds per cow for the year, equivalent to say 6½ pounds per week, including the whole herd for the whole year. The above figures are exact and absolutely trustworthy."

R. Goodman, Jr., of Lenox, Massachusetts, makes the following statement in the columns of the Berkshire Eagle: "Col. Warring gives as a yearly average for a herd of nineteen cows, six years ago, in Newport, R. I., 212 pounds, each of butter."

A Philadelphia herd of 17 cows averaged 255 pounds each per year, each cow earning about $185; this was in 1876.

Mr. Roberts reports the butter yield of Mr. Allen's (Thos. Allen, President Iron Mountain R. R.,) herd of 9 milch cows, at Pittsfield, Massachusetts, at an average of 239 pounds in 1875; 245 pounds in 1876, and in 1877, 278 pounds.

In 1874, Mr. Mackie's herd of 15 cows, in Gt. Barrington, Massachusetts, gave an average of 281 pounds, and this on ordinary feed, and in a breeding rather than a butter making herd.

The National Live Stock Journal, a valuable paper with regard to Jerseys, for April, 1876, "summed up" the yield of 65 Jersey cows, which showed an average of 295 pounds of butter per year:

"Mr. Moses T. Tilden's herd in Lebanon, New York, produced in 1873 an average of 333 pounds, and the herd of Mr. T. I. Hand, of Sing Sing, Indiana, in 1875, an average of 406 pounds.

"Mr. Newton's cow, "*Abbie*," gave last year 486 pounds of butter, besides all the milk and cream used by the family.

"Mr. Thos. Mortley's cow, *Flora*, gave 511 pounds and 2 ounces in one year, her largest yield for one week being 14 pounds, and her smallest, 6 pounds.

"*Pansy* (1,019) gave 572 pounds in 12 running months.

"Mr. Taylor's *Favorite of the Elms*, has given 16¼ pounds in seven days.

"Mr. Ellen's *Jersey Belle*, at five years of age, made, in March, 1876, 19½ lbs. of butter a week, and 10 months from calving, and due to calve, in two months she made one pound of butter a day."

"My cow, *Granny*, produced 50 lbs. of butter in December. She gave 845 lbs. of milk, and made a pound of butter from 14.32 pounds of milk. She is six years old, and weighs 964 pounds.

"*Ida*, 3d, gave over 6,400 pounds of milk during the year 1879. She is seven years old, and weighs 922 pounds. She dropped two calves in 1876.

"*Panther*, four years old last December, gave 5,700 pounds of milk during the year. Previous to January 1st, 1878, *Panther* had given milk 811 days, and made over 850 pounds of butter. She has given a total of 11,041 pounds of milk. At two years old, she weighed 844 pounds." (Thos. Allen.)

"In 1875 my herd (53 grade Jerseys) averaged 220¼ pounds of butter. In 1876 they averaged 231½ pounds of butter." (L. S. Houston.)

"*Echo*, (2,223) nine years old, calved April 12, 1878; June 4 to 10 inclusive, one week—milk, 196¾ pounds; butter, 13 pounds, 15 ounces.

"*Maple Leaf*, (4,768) coming six years old, calved February 7, 1878; June 7 to 13, inclusive, one week—milk, 196 pounds; butter, 14 pounds, 12 ounces.

"*Oak Leaf*, (4,769) coming five years old, calved April 30, 1878; June 7 to 13, inclusive, one week—milk, 242 pounds; butter, 16 pounds, 10 ounces." (J. D. Wing.)

"Jersey cow made in one week 18½ pounds of butter. Same cow made 375 pounds in eight months." (S. Gage.)

This list might be indefinitely continued, but it will suffice to add the experience of the writer with one or two animals:

Plenty, (950) nine years old, from May 12 to May 19, 1872, her calf being ten days old on May 12, made 14½ pounds of butter. For the three weeks following she made an average of 14 pounds and a fraction, the highest yield for one week being 14¾ pounds. This on good pasture, without additional food.

In February, 1872, the two heifers—*Maffie* (952) and *Maiden* (1,464)—two-year-olds, with first calves, were the only milch cows in the stable. On dry food, consisting of bran and hay, they produced, in seven days, 18 pounds of butter.

It is scarcely necessary,

IN CONCLUSION,

to report that the Jersey cow aspires to no place among what are termed the "general utility" breeds. Her qualities are specific. If the farmer is in quest of an animal that will, in proportion to her size and the amount of food consumed, give him a more than average return of first-class butter, accompanied with a liberal yield of rich milk; if he wants a cow that will be active, hardy and docile, and yield a steady income from year to year, let him buy a Jersey. If he feeds his cows for a large flow of milk, without regard to quality, to be immediately sold by the measure; if he proposes milking his cows dry, and disposing of them to the butcher; if he wishes to make beef in connection with dairy product, he will find it profitable to let the Jerseys alone. The first requisite of a good dairy cow is that she should be, in no sense of the word, a producer of flesh. When a purchaser selects a cow for his dairy, with a view to eventually fattening her for beef, when she has become old and pot-bellied, he must make up his mind to lose something at one end or the other. He cannot combine the large annual yield of milk and butter with a tendency to fatten, and if he proposes keeping the cow for a series of years, he should entirely ignore what she will be at the end of the time, and secure all the quality he can during the time. There is plenty of room in this country for beef and dairy cattle. The two cannot be safely combined—that is, we cannot expect perfection in either respect if we undertake to unite the two in one animal. The breeders of Short Horns and the breeders of Jerseys are seeking different and opposite results. The two breeders stand upon the same plane in their respective lines. There is no reason why their interests should clash, and if they will stand by each other, each recognizing the merits of the other, and setting aside small jealousies, they will divide the laurels with the public.

Cheese Making.

BY SHEPARD BROS., ARROW ROCK, MO.

The process of cheese making is essentially one of digestion, resulting from the action of gastric juice, derived from the stomach of the calf by soaking it in brine water.

Mr. A. Holdrige, of West Burlington, N. Y., first impressed upon the dairymen the important part which digestion plays in cheese manufacture.

The coagulation of milk by rennet is the commencement of the digestive process, and the conversion of curd into cheese is due to the further action of rennet inclosed in the coagulum formed by itself. Some acids will curdle milk, but will not take the place of rennet in cheese making. We cannot convert curd into cheese by such an agent. The changes which are wrought upon milk in making cheese are similar to those which occur in the calf's stomach while digesting a meal of milk. The stomach first curdles the milk, then separates the whey leaving the curd in hard lumps, soon to be softened and dissolved into liquid for assimilation.

In cheese making we do just the same thing, only the process is slower and less perfectly performed. We use a very small amount of gastric juice to begin with—1-400 part as much as the calf uses, and work with less warmth, stopping the digestion just before the curd is ready to dissolve.

Cheese thus becomes a very desirable article of food, as it is an easy matter for the human stomach to finish the digestion.

Heat is another agent in cheese making. All know that when the food in the stomach is of too low a temperature, digestion cannot take place, so in curdling milk we must have a sufficient temperature or no coagulation can take place. Dairymen are in the habit of applying rennet to milk at 80 degrees to 84 degrees Fahr. We prefer 84 degrees in winter, and 84 degrees in summer. At this low temperature the process of digestion goes on very tardily, but as we increase the warmth the work moves more rapidly. In doing this, skill is required; the heat must be applied evenly, curd cut into fine pieces, and the whole constantly and gently stirred, gradually increasing the temperature of the mass of curd to 98 degrees. This heating, cutting and stirring is done solely to hasten the action of the rennet.

Rennet is not the only agent which acts upon milk in making cheese. Lactic yeast, which gets into milk from the air or other sources, is always present inducing a tendency to souring. This acidifying agent produces specific effects upon the curd and cheese, which are peculiar and powerful.

It aids rennet in the coagulation of milk, but counteracts rennet action in converting curd into cheese; hence retards the carrying process. Lactic acid has but little influence upon solid fats, but readily takes up essential oils, hence the more acid in cheese making the more are the light flavoring oils of the milk taken up, thus diminishing the musty flavor of the cheese. The fine flavor of both butter and cheese may be destroyed by too much acid. This fact is worth our attention; we *must keep the action of the rennet ahead of the acid or Lactic yeast.*

In manufacturing milk into cheese we must have proper utensils consisting of, cheese vats, presses, hoops, scoops, curd knives, etc The cheese vat consists of a tin vat for holding milk, within a wooden envelope, having a space between them for water to cool the milk at night, and warm it in the morning for "sitting." To the wooden envelope a heater is attached, either at the end or underneath, though some are warmed by steam. The press consists of a gang of screws arranged similarly to our hand cider mills. We need hoops, curd knives, scoops, cloth strains, etc. These can be purchased at the manufactory. We should visit the cheese factory and see for ourselves. We would suggest the use of tin milk pails in the milking yard, as they are more easily kept sweet.

The management of the milk and making process now demands attention. We strain the night's milk through two thicknesses of bandage cloth into the tin vat, and by pouring in cold spring water or running a stream through the wooden envelope, we cool the milk to 60 degrees, if possible, and leave the milk for the night. In the morning we take all the cream off with a dipper or scoop, and pour it into the cloth strainer, through which the mornings milk is to be poured. As we pour in the first of the milk, we rub the cream through the strainer with a small dipper. This is done to get all the cream possible into the cheese. We start a fire in the heater before this, as we wish the thermometer to show 82 degrees by the time all the morning's milk is in the vat, when it is ready to "sit." This consists in coloring and mixing rennet in the milk for coagulation. We mix the coloring matter first, then thoroughly stir in the rennet. (We give receipt for preparing the coloring and rennet at the end of this article.) Let the milk come to a rest for fifteen or twenty minutes, if sufficient rennet has been used, the milk will show signs of curdling, and in about forty minutes will be ready to cut with the curd knife. We determine this by passing the finger through the curd or down the side of the tin; if the curd parts with a clean fracture, it is ready to cross with the knife. As soon as it will stand this test, we pass the curd knife both lengthwise and crosswise of the vat, finishing the cutting with the horizontal knife, having the curd in cubes of an inch or so in size. Now let it stand ten or fifteen minutes, until nicely covered with whey, when we carefully, with the hands, stir the cubes from the side and bottom of the vat, to warm all evenly. We now let on the heat, gradually bring the whole mass up some 5 or 6 degrees higher, stirring sufficiently to prevent packing or heating unevenly. Care in handling, at this point, must be exercised, so as not to mangle the curd, and thus start white whey. Shut off the heat a few minutes, to give the lumps time to warm through, stirring enough to prevent packing. When the lumps are supposed to be warm through, let on the heat again, recutting with the perpendicular knife and stirring with the hands. When the curd reaches 92 degrees or 93 degrees, it should be nearly as fine as wheat and will need no more cutting, but continual stirring and warming until we reach 93 degrees, at which point we stop heating and allow it to go no higher. This process should occupy some two hours and a half. If the acidity is sufficiently started, we immediately draw off the whey and put the curd to draining.

To determine when to draw off the whey, we make a plug of curd and touch it to a hissing hot iron, withdrawing immediately. If minute threads spin out one-half inch, it is ready. If the curd is too immature, it will not adhere to the hot iron. If the acidity is too far advanced, the thread will spin out an inch or more. Mr. L. M. Norton, of Goshen, Conn., originated this test. We think it the best known, and will not occupy space with others. If the curd responds to the test, we immediately draw off the whey, and stir the curd to prevent packing while draining, withdrawing the water and removing the fire when the whey is first drawn off. We keep the curd draining until the little stream of whey breaks into drops, when we thoroughly mix two and one-half pounds of fine dairy salt to one hundred pounds of cheese. The curd is ready for the hoop. We throw over the hoop a strainer cloth and with our wooden scoop shovel in the curd. When the hoop is as full as we desire, we put it to the press, gradually turning down the screw for about an hour. If pressed to hard at first, it will start white whey. We let it remain three or four hours until the curd is nicely joined. It must now be taken out and sacked or bandaged with brown or bleached sacking, which costs from six to seven cents per yard. If we sack, cut two heads of cloth the size of the cheese and a strip long enough to reach around it and about the thickness, all sewed to fit the cheese closely, when we return it to the hoop and press until the next morning. If we bandage, cut a strip of cloth some three inches wider than the cheese and long enough to go around it. Sew the two ends together, slip it over the cheese, pleat both edges down and dampen with water, placing a loose head of cloth over each end of the cheese and return to the hoop to press until the next day. We then take them out and grease the canvas of the cheese with hot lard or butter. The cheese is now ready for the curing room. A basement room is a splendid curing room, if it is dry and nice. Its temperature should be even, not higher than 75°, not lower than 60°. We keep the cheese on the shelves of this room from four to ten weeks (according to the wants of our customers; some like fresh cheese, others prefer it two or three months old,) turning and rubbing each cheese daily, to prevent moulding and aid the curing process. Our curing room must never become hot and dry, neither too cold and damp, as this affects both the quality and quantity of the cheese. The process we have given is for milk that is *absolutely sweet and free from all taint.* We can not make good cheese from sour or skimmed milk. We have manufactured cheese here for twelve years, and believe our customers have always been satisfied with our product. To the inquiring reader, we would recommend Mr. L. B. Arnold's "Manual for Butter and Cheese Makers," address "Rural Home Co., Rochester, N. Y." It is a good and practical work. But to be successful requires practice as well as theory, hence we would advise any one wishing to start in the business to visit some good factory and learn by seeing for themselves. We think cheese making profitable. We will give no statistics, but simply state that one gallon of milk (10 pounds) makes a pound of cheese. A fair cow will average thirty pounds of milk per day on good feed. This will make three pounds of cheese, worth at present ten cents per pound, giving thirty cents per day, or about nine dollars per month, for about three months in summer, with a gradual diminution through the summer and fall. This cow should foot up at least thirty-five dollars worth of cheese during the year. The expense of making will be about five dollars per head. We will allow each reader to calculate cost of food, milking, care, etc., for himself.

TO PREPARE THE RENNET.

Make a brine just strong enough to prevent taint in the rennets, using about two quarts of brine to each rennet. Place the rennets in a small sack made of bandage cloth, and tie it up. Put the sack of rennets in the brine. We must sack them about ten days, rubbing and squeezing the sack with the hands every day, in order to get the strength of the rennets into the brine. When we begin to use, put another sack of rennets soaking in the same manner in another vessel; take the old soak and place it with the new one, marking to distinguish it from the last. As soon as the first jar of liquid rennet is gone, take out the first sack and rinse its contents in a third jar of new brine, which may then be emptied into the first jar. Fill the old sack with new rennets, and remove sack No. 2 into the new brine, and so continue as you consume each jar of liquid rennet. As the strength of rennets vary, we cannot tell precisely how much of this to use, except by actual trial, but we would try a pint to fifty gallons of milk. If it curdles in less than fifteen minutes, it is too much; if it takes forty minutes, it is not enough. We generally cut the rennets open before placing them in the sack.

TO PREPARE THE COLORING.

Take equal weights of anatron, pure potash and sal soda, dissolve each separately in four times its own weight in water. When fully dissolved, mix all together, and let it stand four or five days for the alkali to cut the anatron, stirring occasionally. It is now ready for use. We use a teaspoonful to each five pounds of cheese, or one-half pint to each 100 gallons of milk. If a high color is desired, use more. After a few trials we may know how much to use.

Hogs.

BY H. H. INGERSOLL, OF OSWEGO, TIOGA COUNTY, NEW YORK.

Prepared for the report of the Missouri State Board of Agriculture.

GENERAL DESCRIPTION OF THE SMALL YORKSHIRES.

In regard to the distinguishing points of the "Small Yorks," as shown in the form of the animals, they are characterized as follows: They are very short in snout; finely dished in face; lengthy in body; deep in the chest; straight and very broad on back; fine in bone; very short in the leg, with small, thin and erect ears; fine tail, and thick, square, deeply cut hams and shoulders; they are very short in the neck, with fore hams running close to head; have very small heads, and are low down in fork, and low cut in the flank.

SPECIAL CHARACTERISTICS.

The following leading points may be named in reply to questions frequently asked as to the peculiar characteristics which prove the superiority of the SMALL YORKSHIRES over the common breeds of swine:

1st. They show a fixedness in type of character to be found, I believe, in no other breed of swine yet introduced, and can be depended on to reproduce their like.

2d. They are *quiet in disposition*, and not given to breaking through and over fences; and full-grown animals can be securely kept in a pasture or pen, inclosed by a fence two or three feet in height.

3d. *Tendency to fatten at an early age;* in fact, they are always fat, from the time they are a few days old, if they have half a chance, and are always ready for the butcher's stall.

4th. *Smallness of bone* is another characteristic, as, by actual weight, it is proven that one of the Small Yorkshires has less than one-half the weight of bone found in an animal of similar weight taken from the ordinary breeds.

5th. *Quality of flesh as an article of diet.* For table use the flesh is superior to that of any of the coarser breeds, as is well known and acknowledged in England; there being about the same difference in quality of texture and sweetness of flavor between the flesh of the Small Yorkshire and that of the coarser and commoner breeds of hogs—such, for instance, as the Chester Whites, Poland Chinas, Large Yorkshires, etc.—as there is between the flesh of a well-bred game pullet and that of the coarsest shanghai.

6th. They are not so apt to *choke* as the Suffolks, or die with the thumps, as it is sometimes called, from over fatness.

7th. They are probably most remarkable for the *small amount of food* on which they will *subsist*, *thrive* and *fatten*; carefully conducted experiments showing that what will keep one pig of the common breeds—or natives, as they are sometimes called—in passable condition, will keep three of the Small Yorks so fat that they will sleep in unconscious quiet from one meal to the next. The farmer who keeps a butter dairy, and rears, during the summer, say twenty pigs of the Chester White, or other common, coarse breeds, on buttermilk, can on the same amount of food raise and fatten at least *fifty* pigs of the Small Yorkshire breed.

This statement may appear large, but it is in reality entirely within bounds and rather under than overstated, as I have had occasion to demonstrate by actual experiment, and as is abundantly confirmed by the testimony of many noted breeders in Great Britain. On this point we take pleasure in referring to "Sidney on the Pig," a work published in England. Mr. Samuel Sidney says in his book, page 20: "Mr. Mangles, one of the first pig breeders and feeders in Yorkshire, who has had an extensive experience with the various improved breeds of swine, writes: 'The Small Yorkshire is peculiar to Yorkshire, and different from any other breed I ever saw. It has a short head, small, erect ears, broad back, deep chest, and short legs with fine bone. It is always ready to fatten and turn to account, either in the way of roasters, porkers, small bacon or medium. Three or four of them might be well fed and kept fresh and symmetrical on the food which would barely keep one *lean* and *gaunt* Large Yorkshire.'"

The fact that they "can be raised at *less cost per pound than any other breed"* is attributable to three principal points in which they are admitted to excel all other breeds, viz., *quietness of disposition*, *perfection of form* and power of *assimilation*. "Their power of assimilation, or ability to change food into meat," is truly wonderful, "and is shown by a comparison of the offal with that of other breeds, the difference in the amount of unassimilated or undigested food which passes *this* and *other* breeds being very considerable."

ESSEX HOGS.

BY E. F. JACKSON, SPERRY STA., IOWA.

The Essex is entirely black, and is of English origin. The first improvement was made nearly fifty years ago, by Mr. Western, an Essex 'Squire (afterwards Lord Western), who divided his life pretty equally between the cultivation of live stock and the passionate support of the politics of his friend, Charles James Fox.

While traveling on a tour in Italy, he saw some fine Neapolitan pigs, and came to the conclusion that they were just what was needed to improve the breed of Essex. The Neapolitans was a breed of very peculiar and valuable qualities—the flavor of meat being excellent, and the disposition to fatten, on the smallest quantity of food, unrivalled. Lord Western procured a choice pair of those and crossed the male on Essex sows, and, it is thought, with black Sussex and Berkshires. From those he obtained a breed of cross-bred Neapolitan-Essex pigs, that met with great success at agricultural shows, and could scarcely be distinguished from pure Neapolitans. He continued breeding from his own stock, selecting the most highly refined males and females, and as is a sure result of in and in-breeding his pigs gradually lost size, muscle, constitution, and also fecundity, and at the time of his death, in 1844, while the whole district had greatly benefited from the cross, they were regarded as being more ornamental than useful. But, in the meantime, a tenant farmer of Lord Western, Mr. Fisher Hobbs of Boxted Lodge, had availed himself of the opportunity to use Lord Western's Neapolitan-Essex boars, and crossed them with large, vigorous and rather coarse Essex sows. He also purchased some choice sows of Lord Western's breeding. With the stock then on hand, divided and kept as pure separate families, and making careful selections of their produce, he succeeded in establishing a breed that has since become so famous.

THE IMPROVED ESSEX.

This breed has since been kept mainly in the hand of large stockmen and other gentlemen of wealth, knowing the value of pedigree, and they have become so thoroughly established that, to-day, they are perhaps the purest breed in the United States or England, and the most valuable to the general farmer for the improvement of his common stock. They are remarkable for fine bone, small offal, and early fattening qualities. They frequently dress as high as 90 per cent. live weight. They have a very quiet disposition; will eat the poorest grass and keep fat on clover. They are classed with the small breeds—are larger than the Suffolks, the small Yorkshires, or the small Berkshires, but not so large as the Chester-Whites or Poland-Chinas.

The Essex have remarkable power in imparting the form, disposition and qualities to their offspring. When crossed with common stock, the grades are perfect models of their sires, and will fatten readily at from six to ten months old. The Essex are not a tender breed, but are free from skin-disease, and hardy as any other pigs equally as well bred. The sows are good breeders and excellent mothers, generally raising from six to ten pigs at one litter. Although entirely black in color, when properly dressed they are perfectly white—much whiter than the white breeds. For "breakfast bacon" no breed equals the Essex and their grades. The hams and pork are of the choicest quality, and the lard is remarkable for its whiteness and solidity. The Essex are especially recommended for crossing with and improving the common stock of the country. They will improve any breed which which they are crossed. Sows of the Poland-China or Berkshire breeds, when bred to an Essex boar, will produce grades of remarkable uniformity and beauty. The value of the thoroughbred stock consists chiefly in the power they have of transmitting their good qualities to their offspring when crossed on ordinary stock. The Essex certainly have this power in a very high degree. Their grades have beauty of form, quiet disposition, early maturity and early fattening qualities, and when marketed bring Philadelphia prices.

I have been so busy had not time to write such an article as I desired, but I trust you will excuse me for delaying so long to answer.

Forestry.

BY SAMUEL MILLER, SEDALIA, MO.

This subject has been one of deep interest to me for years; and if I owned prairie land that was without timber, would no doubt ere this have planted largely. But owning plenty of timber land, one-fourth of which shall remain so during my life time, need not practice what in this communication will be preached for the benefit of others.

That the wholesale destruction of our native forests, without any attempts at replacing them has calamity for the future, any one may know from the past.

Countries once fertile and flourishing, when there were plenty of forests, are now a barren waste and desolation prevails, owing mainly to the utter extermination of the trees.

Living, as I now do in a prairie country, where little attention has as yet been paid to the subject, and the woodland along the streams passing slowly away, it gives one a fair chance of judging what the future will be.

It has often been written that a country without timber suffers from drought, is certainly applicable to this region the present summer, for there has been but a few rains for four months. The next question is what, and how shall we plant? Having followed the nursery business for many years, where fruit, ornamental and forest trees were a part of our productions, it may not be vanity to state that we know something about them.

For speedy growth, there are perhaps no three trees that will furnish wood sooner than cotton, sycamore and soft maple; but these three we deem about as worthless as almost any three we could name, when timber for general use is taken into account.

For ornament in lawns we have quite a number of most elegant trees of slower growth, but of more useful wood, sugar maple, box-elder, linden, ash, poplar or tulip tree, Kentucky coffee service or june berry, redbud, etc. But for good sound stock, and for the good of the country and coming generations, we would say plant catalpa, walnut (black), ailanthus, black locust and osage orange. The walnut for its use in the arts, the others for their use for fuel, and their durability in or out of the ground. These are all pretty fast growers, and very easily raised.

Locust seeds must be scalded and soaked some days before planting. Osage orange plants can be bought cheaper than one not prepared for it can raise them. Catalpa, gather the beans from the trees in the fall or winter and plant in the spring, in drills, as soon as the ground is warm. Ailanthus, treat in the same way. Walnuts should be gathered in the fall, and put into the ground one foot in rows, and if cultivated properly, will be large enough in one season to plant where they are to remain. In planting a forest we would plant all but the walnut, five feet apart each way. No matter how many it takes at the start, they are cheap. When they have been there two years, cut them back to within six inches of the ground. This will cause them to send up vigorous shoots, all of which should be pinched back when they have fairly started, except the best or leading one. As soon as it has attained about eighteen inches in height, take off the rest gradually, so as to force all the strength of the stock into one shoot. Anyone who has never tried this will be astonished at the growth they will make by the end of that season; if they are in good soil and have been well cultivated, they will then have straight stems, and reach from eight to twelve feet in height, and already be a little forest. Let them now take care of themselves, for each one avoids its neighbor, and will, owing to their close proximity, shoot upwards.

When they have stood ten years they are already fit for bean poles, grape stakes, or any purpose of that kind, if needed; if not let them stand a few years more and they will make fence stakes, and if cut at the right season, early in September, you will have stakes, that if properly seasoned, will not rot. Of course we don't include walnut in this. Planting five feet each way gives nearly eighteen hundred to the acre.

But when cutting out is commenced, it should be begun at one corner, and every alternate row cut out diagonally. This will take out one half the trees, leaving the remaining ones ten feet apart, at which distance they will soon grow to make a small post. The cutting of them in latter part of August or beginning of September is not only best for the durability of the timber, but the stump will usually die and not trouble one with suckers thereafter. When cutting any out, the brush should be burned upon the ground, leaving the ashes there for the benefit of those left. Of course the fires so arranged as not to scorch the live trees.

Supposing some man would have set out ten acres here, say fifteen years ago, and treated as above directed, what would they now be worth? More money than any one hundred acres around here outside the city limits, where good posts can hardly be got at any price and where fire-wood costs four and five dollars per cord. And just here is the place for some one to do it for the future. When a boy we helped to plant groves of locust trees, or rather we put the seed where the trees were to stay. Twenty years thereafter we visited the old place, and some of the trees were one foot in diameter, and twenty feet to the first limbs. Locust posts would then sell at $1.00 apiece at public sale, at times. An Osage orange branch, ten inches in diameter, has been in the ground, as a grape stake, for five years to our knowledge; the vine died, and when we could not pull out the stake, tried to break it off, but in vain.

But this is, perhaps, enough upon the subject, if it will only induce the rising generation to try it. For ourselves, the time would be too short to do much, even if necessary. When a man is close to three score years, he cannot expect to see tall forests grow over his head, of his own starting.

Nomenclature and Classification of Soils.

BY G. C. SWALLOW, LL. D., DEAN OF AG. COLLEGE.

The nomenclature of soils has ever been somewhat imperfect; so much so indeed, that it has often been most difficult to determine the exact nature of the soils mentioned by even the best writers on agricultural topics. This difficulty has arisen mainly from three causes:

1. *From the natures of the soils themselves.*—The different kinds of soils pass into each other by such imperceptible gradations, that it is often difficult for the most skillful to determine to what species some soils belong.

2. *From the indefinite nature of the names used.*—Many of the names used, though positive in form, are merely comparative in use. *Silicious* in its positive signification, might be applied to any soil containing silex; but its technical use is restricted to a soil containing a large or unusual amount of silex. Sir Humphrey Davy says .86 of sand makes a *sandy soil.*

3. *From the use of local names.*—Nearly all agricultural communities have local names for their soils, which are sufficiently definite, where common use has fixed their meanings; but these names fail to convey definite meanings to those not acquainted with their local applications. *Mulatto soil* is sufficiently definite to farmers in some localities, but to others it would be simply a *mule soil* of some kind; probably dark colored.

But the classifications and names of soils in general use among English and American writers, are based upon the *chemical* and *physical* properties of the soils, their *natural products* and *the rocks* from which they are formed.

CLASSIFICATION BY CHEMICAL PROPERTIES.

Each of the chemical elements essential to all good soils may become so prominent as to form a factor in the name and classification;

as when lime is unusually abundant in a soil, it is called *limy* or *calcareous*. Hence our *nomenclature* contains the terms, *silicious*, *argillaceous*, *ferruginous*, *magnesian*, *calcareous*, *saline* and *alkaline*.

When the soil contains a large amount of organic matter, it is called *peaty*, *humic* or *mouldy*, as the organic matter is more or less abundant or decomposed.

If two elements are abundant, the name may compounded of both, as *silico-calcareous*, for a soil rich in lime and silica.

But Prof. James F. W. Johnston has given rules by which we may arrive at a more definite use of many terms employed in describing soils, as sand, clay, lime and organic matter form the principal ingredients of all soils. The proposed nomenclature is based upon comparative quantities of these four substances in dry soils.

Pure clay, (*pipe clay*,) has no appreciable quantity of the other ingredients of a soil, and contains about .50 of silica and .40 of alumina in chemical combination forming the clay.

The strongest *clay soils* contain from .05 to .20 of silicious sand.

Clay loam contains from .28 to .40 of sand.

Loamy soils contain from .40 to .70 of sand.

Sandy loam contains from .70 to .90 of sand.

Sandy soils contain over .90 of sand.

Marly soils contain from .05 to .20 of lime.

Marly soils are *sandy*, *loamy* or *clayey marls*, as the ingredients indicated prevail in them.

Calcareous soils are those having more than .20 of lime. Calcareous soils are called *clayey*, *loamy* or *sandy*, as the ingredients indicated prevail.

Vegetable moulds contain various proportions of organic matter from *garden mould*, with from .05 to .10, to *peaty soils* with from .60 to .70 of organic matter.

These soils are also called *clayey*, *loamy* or *sandy*, as the ingredients indicated prevail in them.

It may be objected that farmers can not determine the per centage of *clay*, *sand*, *lime* and *organic matter* in their soils. But any skilful workman can easily determine the proportion of these ingredients by supplying himself with a few simple articles of apparatus, such as a small *balance*, with grain weights, a small platinum *capsule*, a *spirit lamp* and *hydrocloric acid*, or, an *iron spoon* and a *charcoal fire* may serve instead of the *platinum capsule* and *spirit lamp*.

It is not claimed that any one can make a complete analysis of a soil with this apparatus, for this most difficult process requires pure chemicals, good apparatus and a skillful chemist. But that with very simple apparatus a good workman can easily determine the percentage of the four substances, upon which this classification and nomenclature is based, with sufficient accuracy to enable the farmer to classify his soils and apply the names with all needed precision.

The operation may thus be performed:

1. Spread 200 grains of the soil, dried in the sun, on white paper, and place it on a stone and heat slowly until the paper begins to turn brown. . Weigh, and the loss will give the percentage of *water*.

2. Heat 100 grains of the dried soil in the capsule over the spirit lamp, (or in an iron spoon over a coal fire,) to a dark red, and until the organic matter is burned out, and the loss will be the percentage of *organic matter*.

3. Put the soil already burned in a glass goblet, half full of rain water, and add the acid a little at a time, as long as the effervescence continues. The mixture should be stirred occasionally with a glass rod during the process. When it has thoroughly settled for several hours, the acid and water must be carefully poured off, and a fresh supply of water added and thoroughly stirred with the soil, and poured off after settling as before. Dry the remaining soil, as in No. 1, and the loss will give the amount soluble in the acid, which is nearly all lime.

4. The remainder of the soil will be the sand and clay, which may be separated by thoroughly mixing them with water in the goblet, allow the sand to settle, and then pour off the water, holding the clay suspended into another goblet or tumbler. The sand may be marked a second time, and the clay poured off as before. The two portions dried and weighed, as in No. 1, will give the percentage of *sand* and *clay*.

The five results added will give about 100 grains, if no material error has been made.

This analysis takes no account of the iron, magnesia, soda, potassa, sulphur, phosphorous and chlorine, which usually exist in such small quantities that they would vary the result less than .05. The most of these substances would be with the lime and clay. The organic matter will be too great by the water not driven off in drying.

But this analysis will yield results which will enable one to give the soil its proper name and classification.

CLASSIFICATION BY PHYSICAL PROPERTIES.

Soils are also classified and named according to their *physical properties*. The most important of the physical properties of the soil are *weight*, *color*, *fineness*, and its *relations* to *heat*, *water* and *air*.

The *weight* or *specific gravity* of soils varies when dry, from 30 to 110 pounds per cubic foot, according to the relative proportion of their ingredients, since these ingredients vary much in weight. Thus:

Sand weighs, per cubic foot, 110 pounds.

Clay, (pipe clay) per cubic foot, 75 pounds.

Carbonate of magnesia, per cubic foot, 16 pounds.

Humus, (decayed organic matter) per cubic foot, 35 pounds.

The *soils* of the *hickory lands* in Missouri weigh about 80 pounds per cubic foot, and the sandy bottom soils about 100 pounds per cubic foot. The *hackberry lands* and *magnesian limestone lands* have soils much lighter, for the former has more humus and the latter more magnesia.

The properties have given rise to such names as *heavy soils* and *light soils*, indicating the greater or less weight of the soil. But, unfortunately, these terms are more generally used to designate other properties of soils; as heavy is used to denote a *wet* and *adhesive* soil, and light to designate a *loose* and *friable* one.

The *colors* of *soils* depend upon the elements entering into their composition. *Organic matter*, *humus*, renders soils *black*, while *magnesia* and *lime* make them *white*. Iron gives a *red*, *brown* or *yellow* color. Hence we have such names as *black*, *white*, *brown*, *yellow* and *red soils*. *Dark* and *light* are also used to denote the color of soil.

The *fineness* of soils indicate the degree of division of the materials of the soil. The materials of some soils are exceedingly minute, as in the *hickory* and *white oak lands*, while in other places the materials are coarser, as is usual in the *pine* and *magnesian limestone lands*, which in some places have numerous fragments of chert, so filling the soil as to render it almost useless for ordinary culture.

From these properties we have *fine*, *clayey*, *coarse*, *sandy* and *rocky soils*.

The *adhesiveness* of soils depends upon the kind and proportion of the ingredients. While the adhesive power of sand is very small, and that of clay is very great, gypsum, carbonate of lime and humus show a medium amount of cohesion.

Clayey soils stick when wet, retain the water, and bake on drying; hence they are called *adhesive*, *compact and cloddy*.

Sandy soils, on the contrary, are not adhesive; they never bake, and are called *loose* and *friable*.

Clay has great power to retain an excess of water; hence clay soils are *wet* and *retentive*.

Sandy soils rapidly lose any excess of water, and are called *dry* and *leachy*.

Some soils, and especially those of a dark color and loose texture, so absorb the heat of the sun's rays that they become much warmer than the surrounding air. Such soils are called *warm*. Other soils, and particularly such as are wet and retentive, do not absorb so much heat, and are called *cold*.

CLASSIFICATION BY NATURAL PRODUCTS.

One of the most natural and common modes of distinguishing and naming soils, is by the plants they produce. When it is found that any variety of soil produces superior crops of any staple, it is usual to give it the name of that staple. Hence we have in common use such names as *hemp soil*, or *hemp land*, *wheat soil*, *cotton land*, *bluegrass country* (*soil*) and *grape soil*.

This mode of classifying and naming soils, is at once most useful and philosophical. It is most useful, as these names convey to all, distinct ideas of the qualities of the soils mentioned, and it is philosophical since each plant requires special properties of soil for its perfect devlopment, as wheat must have an abundance of phosphates and silica.

But this mode of classification, becomes most reliable when it is applied to the virgin soil and its natural productions. The fact that one soil has for hundreds of years produced white oak as its principal growth, and that an adjacent soil has yielded the American elm with but few other trees, indicates such radical difference in the two soils as no farmer can afford to ignore, either in the purchase or culture of his farm. Indeed, a long series of careful observations clearly show, that the natural products of a soil as clearly show its chemical and physical properties, as do the alembic of the chemist and the plow of the husbandman.

From this source we have such general terms as *timber* and *prairie*, and the more specific *pine barrens*, *oak openings*, *cypress*, *cedar sphagnum and cranberry swamps*, *sage-brush and mezquite plains and bunch grass*, *and gramma grass regions.*

This system of classification is particularly valuable in new countries, where the indigenous productions of the soil have not been disturbed by man ; and on it is based the most perfect and best known classification of the soils of our own State.

CLASSIFICATION OF MISSOURI SOILS BY THEIR INDIGENOUS TREES AND OTHER PLANTS,

Like the plants upon which it is based, this classification appears to be indigenous, to have sprung spontaneous from the tillers of the soil. It is simple, easily understood, and at the same time, gives the most certain indications of the properties and values of the various soils of the State. The culture, purchases and sales of our lands, have been largely controlled by the knowledge it has given us.

Prairie lands are well defined by nature, and distinct from timbered lands in respect to the vegetation they naturally produce. The latter produce trees and shrubs, and some grasses and other herbaceous plants; and the former produce grasses and other herbaceous plants only. But each division contains soils of all grades of productiveness, from the very best to the poorest. And yet the timbered lands have one advantage over the prairie. If two soils be taken side by side, both based upon the same formation, and both subject to the same influences during their formation, save one has produced trees and the other grasses, and the trees have decayed on the one and the grasses have been burned on the other, the former will have more decaying vegetable matter, and will be lighter, warmer, and more kindly in cultivation. But if both be put under the same culture, this difference will gradually disappear, as the vegetable matter will decrease in the one and increase in the other. This difference in these classes of soils, rendered the timbered lands much the more popular among the older settlers.

These *prairie lands* occupy nearly one-half of the entire area of the State, or about thirty thousand square miles. They possess all the varieties of soils found in the timber, and are identical with them save in the differences above named.

The grasses are as diversified, and as distinctly mark the varieties of soil on the prairies, as do the trees in the timber. The resin-weed, crow-foot, and wild sorghum, indicate as good soils on the prairies as do the elm, hickory, and walnut, in the timber. But, as the trees are more conspicuous and better known, the varieties of soils are best known by the timber they produce.

The following divisions are well-known and recognized by the people of Missouri:

Hackberry lands possess the best upland soils in the State. The growth is hackberry, elm, wild cherry, honey locust, coffee tree, pig-nut, hickory, chesnut and bur oak, black and white walnut, mulberry, linden and papaw.

The chemical properties of our soils very closely correspond to the indications of the natural products, as shown by chemical analyses. These analyses are given to compare the chemical properties with the natural products of our soils.

Analysis of Soil No. 1, from hackberry lands in Platte county.* "Soil No. 1 A" 8 inches below the surface, and "No. 1 B" 18 inches below the surface. Of 100 parts, dried at 100° C., it contains:

	Soil No. 1 A.	Soil No. 1 B.
Organic matter and water	5.6470	4.2936
Insoluble in acid, silica, etc.	88.1600	84.2900
Chlorine	0.0075	0.0050
Sulphuric acid	0.0000	0.0300
Silica (soluble)	0.3131	0.2940
Peroxide of iron	2.5135	4.6680
Alumina	2.5309	4.5968
Lime	0.6205	0.5153
Magnesia	0.5262	0.7875
Alkalies as chlorides	0.6670	0.6705
Phosphoric acid	1.1985	0.1817

The *Crow-foot lands* of the prairie region, have soils very similar in quality to the *Hackberry lands*, and these two soils generally join each other where the timber and prairie lands meet.

Analysis of Soil No. 2, Crow-foot land in Saline county. A was taken six inches below the suface, and B, eighteen inches below the surface. This soil had been cultivated in hemp.

	A.	B.
Chlorine	0.0091	0.0071
Soluble silica	0.3811	0.2798
Alumina	3.1774	3.8890
Peroxide of iron	2.5554	3.0067
Lime	0.4732	0.3293
Magnesia	0.4522	0.4454
Potassa	0.2950	3.3293
Soda	0.1305	0.0353
Carbonic acid	0.1370	0.727
Sulphuric acid	0.0287	0.0269
Phosphoric acid	0.2354	0.3424
Water 150° C	0.5093	0.5787
Organic matter	6.1872	5.0633
Insoluble in acid	84.5890	85.2967

These soils abound in the western counties, from Atchison to Cass, and eastward to Saline and Howard. They also cover small areas in other parts of the State.

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*The analyses in this Report were made by Dr. A. Litton, of Washington University.

They cover an area in the regions indicated of some 6,000,000 acres.

The productive and durable qualities of this soil are surpassed by none in the country. It has sufficient sand for the water to drain off rapidly in wet weather, and enough of clay, lime, magnesia, and humus, to retain the moisture in the dry. It rests on a bed of fine silicious marls, which will render it perpetually fertile under deep tillage.

These productive powers are well illustrated in the gigantic forests and luxuriant grasses produced by it.

White oaks grow upon it 29 feet in circumference and 100 feet high; linden, 23 feet in circumference and 100 feet high; bur oak and sycamore grow still larger.

Herds of buffalo, elk, and deer, were entirely concealed from the hunter by the tall prairie grasses of the crow-foot lands.

Hemp, tobacco, corn, and the cereals, grow upon them in great luxuriance; and no soil is better adapted to fruits of all kinds.

These 6,000,000 acres of the best land on the continent are capable of feeding and sustaining 2,000,000 people. A population of 1,000,000 could live on these rich, broad acres in comfort and luxury.

Elm lands are but little inferior to the hackberry. The name is derived from the American elm, which grows so large and abundant in the magnificent forests of these lands.

The principal growth is elm, hackberry, honey locust, black walnut, cherry, blue ash, black oak, redbud and papaw.

Analysis of Soil No. 3, from elm lands in Marion county. "A," 6 inches below the surface, and "B," 18 inches below the surface.

	No. 3 A.	No. 3 B.
Chlorine	.0072	.0035
Sol. silica	.1445	.1769
Sulphuric acid	.0577	.0438
Phosphoric acid	.1023	.0944
Carbonic acid	1.0190	.1453
Peroxide of iron	2.5310	3.2920
Alumina	2.3931	3.6884
Lime	.5430	.2939
Magnesia	.4365	.5654
Alkalies as chlorides	.2696	.4281
Water at 150° C.	1.0920	......
Organic matter	5.4500	4.3270
Insoluble in acid	87.0720	87.1889

This soil abounds, interspersed with hackberry lands, in the region above named; and in the east, it covers large areas in Marion, Monroe, Boone, Cooper, St. Louis, Greene and many other counties.

The "*Resin Weed Lands*" of our prairies, have about the same qualities of soil as the elm lands above described.

Soil No. 4 A, was from resin-weed land, six inches below the surface. Soil No. 4 B, was from the same place, 18 inches below the surface. This soil had been cultivated in hemp.

	No. 4 A.	No. 4 B.
Chlorine	.0084	.0085
Sol. silica	.3080	.2432
Sulphuric acid	.0126	.0202
Phosphoric acid	.3309	.2155
Alumina	2.4205	4.1500
Peroxide of iron	2.3200	3.1810
Lime	.3688	.4558
Magnesia	.3006	.5283
Potassa	.3134	.3926
Soda	.1222	.0639
Insoluble in acid	86.8100	85.7260
Organic matter	5.5600	4.1751
Water at 150° C	.4300	.7629

These elm lands are but little inferior to the hackberry lands above described. The materials of the soil are a little finer, and the soil itself is slightly more compact and adhesive.

It occupies some 3,000,000 acres, interspersed with hackberry lands, in the western counties, and with hickory lands further east in Marion, Monroe, Cooper, Boone, St. Louis, Greene and other counties.

Its heavy forests and luxuriant prairie grasses and chemical properties, clearly indicate its great fertility; and the marls upon which it is based, fully assure its durability. A grape-vine growing on this soil, was 22 inches in circumference and 180 feet long, and an elm, 22 feet in circumference and 90 feet high. Hemp, tobacco, corn, wheat and other staple crops grow luxuriantly, and all kinds of fruits, adapted to the climate, do well on this soil.

Hickory lands hold the grade next to the elm lands, and are characterized by a growth of shell bark hickory, black, red and laurel oaks, sugar maple, persimmon, dogwood, redbud and crab-apple. In the southeast the tulip tree, beech and black-gum, grow on soils of about the same quality. This soil is not so deep, has a sub-soil more impervious, and the underlying marls have less sand and lime and more clay than the elm lands.

Soil No. 5, hickory land from Scotland county. No. 5 A, from 2 to 8 inches below the surface, and No. 5 B, from 18 to 20 inches below.

	No. 5. A.	No. 5 B.
Silica (soluble)	.0830	.0818
Peroxide of iron	3.4596	4.0557
Alumina	4.9748	6.2499
Lime	.3884	.2208
Magnesia	.4543	.4735
Potassa	.6124	.4692
Soda	.3096	.2492
Chlorine	.0072	.0115
Sulphuric acid	.0302	.0182
Phosphoric acid	.1908	.1416
Water at 150° C	1.1407	1.0508
Organic matter	7.3316	5.2267
Insoluble in acid	81.3985	81.7739
	100.3811	100.0229

There are large areas of prairie in the northern, northeastern and southwestern parts of the State, which have soils of about the same character and quality as these hickory lands. This variety of soil is sometimes called "mulatto soil."

Soil No. 6, from the farm of Col. M. G. Singleton, Grand Prairie, possesses about the same qualities as the hickory lands.

No. 6 A, 2 to 8 inches below the surface. No. 6 B, from 10 to 12 inches below; and 6 C, from 18 to 20 below the surface of the virgin prairie.

	No. 6 A.	No. 6 B.	No. 6 C.
Soluble silica	.1961	.1639	.1010
Peroxide of iron	2.9576	4.1244	2.8933
Alumina	4.6789	5.7829	3.9593
Lime	.3066	.2067	.2135
Magnesia	.3066	.4016	.4600
Potassa	.3264	.3925	.3443
Soda	.1401	.1662	.1684
Chlorine	.0093	.0061	.0082
Sulphuric acid	.0210	.0340	.0327
Phosphoric acid	.0680	.0301	trace.
Water at 150° C	.7525	1.0016	1.3248
Organic matter	7.2672	5.6284	7.2869
Insoluble in acid	83.6330	82.4517	82.7504
	100.6627	100.4001	99.5428

This soil is highly productive and very durable. Our farmers hold it in high estimation for wheat, corn, oats, timothy, clover and blue grass. Nearly all the fruits of this latitude succeed well on our hickory and the corresponding prairie lands.

This soil covers an area of some 6,000,000 acres, mostly in the central and eastern portions of the State.

White oak lands occupy ridges where the lighter materials of the soil have been washed away. They sustain a growth of white and black oak, shell-bark and black hickory, dogwood, sassafras, red-bud and fragrant sumach.

Soil No. 7 is from a white oak ridge in Boone county. No. 7 A, from 2 to 6 inches below the surface; No. 7 B, from 10 to 12, and No. 7, C, from 18 to 20 below the surface of the virgin soil.

	No. 7 A.	No. 7 B.	No. 7 C.
Water expelled by drying at 150° C.......	0.4105	0.8030	0.6558
Organic matter and water not expelled at 150° C..............................	3.0957	3.8901	2.6049
Silica, etc., insoluble in hydrochloric acid.	90.1420	85.0571	90.8063
Soluble silica............................	0.1384	0.2187	0.1475
Alumina................................	3.0654	4.7672	2.9346
Peroxide of iron..........................	2.0553	3.8814	2.0590
Oxide of manganese......................	a trace.	a trace.	a trace.
Lime....................................	0.2086	0.4722	0.1242
Magnesia	0.3423	0.6581	0.2048
Potash..................................	0.3368	0.3895	0.2121
Soda	0.1828	0.1220	0.2925
Phosphoric acid..........................	0.0560	0.0556	0.0346
Sulphuric acid...........................	0.0035	0.0099	0.0508
Chlorine.................................	0.0000	0.0276	0.0000
	100.0373.	100.3524	100.1311

The surface soil of these white oak lands, is not so rich as the last named variety; but the sub-soil is better than the surface, as is shown by the above analyses of this soil at different depths. The No. 7 B, taken from the depth of 10 to 12 inches, shows more organic matter, lime, potash and magnesia than No. 7 A does, taken from a depth of 2 to 6 inches below the surface in the primitive forest. This condition of the soil, is doubtless due to the removal of the lighter portions of the surface soil by the rains through the ages of its formation; and it shows the benefits to be derived from deep plowing.

Our white ridges produce superior wheat and tobacco, good corn and other staples. They are the best fruit land in the regions where they abound north of the Missouri and between that river and the Osage.

Our white lands cover an area of some 1,500,000 acres.

Post oak lands occupy ridges generally on the south side of the Osage, and produce post and black oak, hickory, sassafras, dogwood and sumack. The growth is about the same as the white oak ridges, substituting the post for white oak.

This soil is based upon a light-colored *marl*, with less lime and sand than is found in the marls underlying the white oak lands; but it produces good crops of the staples of the country, and has for several years yielded the best tobacco of the West. Fruits, of all varieties cultivated in our latitude, excel on this soil.

Deep culture with the sub-soil plow, leaving the sub-soil beneath, will render this land more productive and durable. The area covered by post oak lands is very large, but not definitely known—probably 3,000,000 acres.

Black jack lands occupy many of the flint and sandstone ridges south of the Osage. They are usually underlaid with strata of flint or sandstones and some magnesian limestone, whose fragments often fill the soil.

The growth is mostly black jack and black hickory, sometimes interspersed with a few grape vines and scattering sumac.

This soil is largely formed of a lifeless clay and sand, often filled with fragments of flint, resting upon a sub-soil of the same materials.

It is the poorest soil in the State, and will be of but little use save for pastures and fruits. It may be made profitable for orchards and vineyards. The cultivation of grapes on these flint ridges, will be more expensive, but the juices may be rich enough to pay the extra expense.

Those underlaid with magnesian limestone and flint, will produce excellent wines, and may become profitable grape lands when wines shall become more esteemed for quality than quantity.

Black jack lands occupy some 3,000,000 acres, mostly south of the Osage.

Pine lands have a growth of pine, post, white and black oak, black hickory, dogwood and sassafras. They have an inferior, sandy soil, and occupy the plateaus, hills and ridges of Southern Missouri, which are underlaid by the sandstones of the magnesian limestone series.

This soil usually rests upon a sandy subsoil, and would be greatly benefited by clay, marl and humus. But the best means of making these lands more productive, is by the use of plaster or lime and clover.

The area occupied by our pine lands has not been determined, but can not be less than 2,000,000 acres, all south of the Osage.

There are other soils in the State as well known from the positions they occupy and the rocks from which they are formed, as from the trees which they produce.

Magnesian limestone soils are based upon and largely derive from the magnesian limestone series, or mineral-bearing rocks of Southern Missouri. They produce a great variety of trees and shrubs, among which black and white walnut, black gum, elms, sugar maple, honey locust, rock chestnut, scarlet, laurel and white oaks, ash, hickory, buckeye, hazel, dogwood, haws and grapes are often conspicuous.

Soil No. 9, from a magnesian limestone slope in Callaway county:

Water expelled by heating to 150° C.	1.1700
Organic matter and water not driven off at 150° C	9.6299
Silica, etc., insoluble in hydrochloric acid	54.2600
Soluble silica	0.1639
Alumina	10.8588
Peroxide of iron	2.5186
Manganese	a trace
Lime	8.0720
Magnesia	1.6609
Potassa	1.6378
Soda	0.3442
Carbonic acid	10.1111
Sulphuric acid	0.0605
Phosphoric acid	0.0950
Chlorine	0.0053
	100.5880

This soil is dark and warm, and rich in lime, magnesia and humus. It is productive, durable and well suited to withstand the droughts of our summers. It yields abundant crops of our farm staples, and is the best fruit soil in the country.

These lands occupy the slopes, hillsides and narrow valleys of the southern and southeastern parts of the State, and the northern slopes of the Missouri east of Providence, an area of some 10,000,000 acres, in one of the most delightful and healthful regions in the world.

This large area, extending from the Missouri river to Arkansas, and from Marshfield to Cape Girardeau, is a table-land, varying in elevation from 300 to 1,500 feet. It is cut by deep winding valleys in the south and north, and broken into knobs and ridges toward the east. Large, bold springs of pure.cool waters, gush from every hillside, and fill the valleys with limpid streams. Magnificent forests abound, and wild grapes everywhere mingle their purple clusters with the foliage of the elm and the oak, the mulberry and the tulip tree.

The climate is delightful. The winters are short and mild, the summers long and temperate. Its skies vie with those of Italy, and its fountains and streams, valleys and mountains, equal their favored prototypes in classic Greece.

No soil can surpass this for the grape, and the mild winters and long summers, favored by the warm dry winds of the southwest, are most favorable for maturing their rich juices.

Such are the soils on the uplands of Missouri. The bottom lands are not less important and interesting. They present the following varieties. The whole is divided into *Bottom Prairie* and *Bottom Timber:*

Bottom prairie has a light, rich, deep, dark and productive soil, clothed with luxuriant native grasses, among which a species of sorghum is conspicuous. Before these savannas were pastured, the grasses grew to a height varying from five to ten feet.

Soil No. 10, virgin bottom prairie, from General Sterling Price's farm in Bowling Green Prairie, Chariton county:

No. 10 A, 2 to 6 inches below surface; No. 10 B, from 10 to 12; No. 10 C, from 18 to 20, and No. 10 D, from 30 to 36 inches below the surface.

	No. 10 A.	No. 10 B.	No. 10 C.	No. 10 D.
Soluble silica	.2012	.1792	.2152	.1144
Alumina	3.2074	3.5016	3.4468	3.0391
Peroxide of iron	2.0442	1.9716	2.0467	2.0603
Lime	.5484	.4754	.4213	.4514
Magnesia	.4921	.2000	.2103	.2786
Potassa	.3138	.4766	.4185	.2665
Soda	.2042	.1588	.0831	.1736
Sulphuric acid	.0726	.0764	.0774	.0615
Phosphoric acid	.3874	.2716	.2018	.2142
Chlorine	.0068	.0082	.0057	.0102
Water at 150° C	.7077	.9658	.9254	.5081
Organic matter	4.4185	3.6491	2.2621	2.1781
Insoluble in acid	87.3756	87.9796	89.3720	90.8520
	99.8799	99.9139		100.2280

As this analysis indicates, the soil of the bottom prairie is rich in all the elements of fertility. They are deep and light, and but slightly affected by excessive wet or drought. Hemp, tobacco, and all the staple crops, grow on it with luxuriance.

The bottom prairie covers a large portion of the Missouri bottoms above Glasgow, and some considerable areas in St. Charles, Marion, and the southeastern counties on the Mississippi. Some of these prairies on the Missouri are twenty and thirty miles long, and from two to ten miles wide; as the broad Wyaconda and Huppan Cuty. The areas of these lands are constantly decreasing by the action of the river and the encroachment of the forests; but there still remains about 1,000,000 aeres of these rich and beautiful natural meadows.

There are some considerable areas of bottom prairie, which are wet and swampy, as in St. Charles county.

The *bottom timber* has several natural divisions, well recognized by the people of the country, and designated as "*high bottom*," "*low bottom*," "*wet bottom*," or "*swamp*," and "*cypress*."

High bottoms have a deep, porous and rich sandy soil, which produces a gigantic growth of elm, sugar maple, white ash, cherry, locust, linden, sweet gum, buckeye, bur, red Spanish, swamp and scarlet oaks, thick shell-bark hickory, hackberry, pecan, black walnut, plum, catalpa and mulberry. Grape-vines, trumpet and Virginia creepers, poison oak and wistarea, climb the highest trees, and mingle their scarlet and purple flowers and fruits with their highest foliage.

The fertility of this soil is well attested by its chemical properties and the large trees grown upon it. The following, among other samples, were measured in 1857:

*Sycamore	43	feet in circumference,	65	feet high.
Catalpa	10	" "	90	feet high.
Cypress	29	" "	130	feet high.
Cottonwood	30	" "	125	feet high.
Black Walnut	22	" "	110	feet high.
Spanish Oak	26	" "	90	feet high.

Soil No. 11 is from a corn-field in the high bottom opposite the mouth of the Ohio river, in Mississippi county. It had been cultivated several years. Analysis gave the following ingedients:

Soluble silica	.1331
Peroxide of iron	2.3385
Alumina	3.2864
Lime	1.3897
Magnesia	.9708

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* This tree was broken off at this height. It was, doubtless, like its neighbors, 125 feet in height.

Potassa	.4372
Soda	.1679
Sulphuric acid	.3002
Phosphoric acid	trace
Water at 150° C	.4554
Organic matter	6.2199
Insoluble in acid	84.7782
	100.5586

This soil covers all the bottoms of our rivers which are above the usual high waters—about 2,500,000 acres. It is very productive, and so deep and porous that the crops are but little affected by dry and wet seasons. Hemp, corn, tobacco and the cereals are grown on this soil in rich abundance. This is emphatically the corn land of the Mississippi Valley.

Low bottoms have a soil similar to the high bottoms, but they are so low as to be covered by water at ordinary overflow. Sycamore, cottonwood, white maple, box-elder, red birch, buckeye, hackberry, willow, river and frost grapes and poison ivy, are the most common productions. They grow to vast proportions.

The overflows render these lands nearly useless for farming purposes; but when the floods are kept out by levees, they are most productive and valuable. There are large areas of these lands in Southeast Missouri—in the State nearly 2,000,000 acres.

Swamp or *wet bottom* are terms usually applied to a variety of bottom lands very similar to the two preceding, but differ in being so located as to be saturated with or nearly covered by water. This excess of water renders them useless for ordinary culture. The sustain a heavy growth of pin, swamp and red oak; holly, spice bush, white and black ash, red birch, box-elder, button-bush, sycamore, cottonwood, whahoo elm, sweet gum, water locust, white and red maple, poison oak, frost and river grapes.

Cypress. This name is given to low bottoms which are covered with standing water for a large part of the year. The decomposition of vegetable matter in these waters adds a new deposit of vegetable mold annually to their rich soil, which sustains a very heavy growth of cypress, tupelo, sour gum, water locust, white and red maple, pin and Spanish oaks.

These cypresses are numerous and very extensive in Southeast Missouri. Buffalo cypress and honey cypress are good samples. The central and wettest portions of them usually have deposits of bog ore. These soils are useless for ordinary farming purposes; but their timber is unique, abundant, and most valuable.

The area of swamp and cypress lands will reach 1,000,000 acres.

Such are the soils of Missouri, as they are recognized by the people of the State from their natural productions.

The area attributed to each, has been determined with tolerable accuracy by observations extended over nearly every county of the State for a period of thirty years.

CLASSIFICATION OF THE ROCKS FROM WHICH THEY ARE FORMED.

As all soils are largely made up of materials derived from the rocks upon which they rest, the ingredients of the rocks must determine the nature of the soils. Hence, the soils resting upon the flint rocks in some parts of the State, are filled with fragments of flints; soils resting upon sandstone, will be sandy, and those resting upon clay, will be argillaceous. This principle is universal, save in a few instances where materials are transported from distant rocks and placed upon the soil in sufficient quantities to change its character. Ashes from volcanoes often fall on soils in sufficient quantities to change their properties, rendering barren soils most fertile. Rivers often overflow the adjacent regions, depositing sands in sufficient quantities to change rich soils into barren sands. Such injurious changes are often made by the floods of our great rivers. Many farms in the Missouri bottom were thus ruined, and others much injured by the flood of 1844.

Sands, drifting before the winds, often convert most fertile regions into barren wastes. Thus the sands of the great African desert, drifting eastward, have converted the most fertile and populous regions into sterile Saharahs; and would long since have added the whole valley of the lower Nile to its barren realm, had not the waters of that wonderful river brought from Central Africa its annual tribute of rich slime to fertilize the encroaching sands.

But all the soils of Missouri, save the instance above named, derive their characteristics from the rocks on which they rest. Thus nine-tenths of all the soils of the State, north of the Osage and of St. Louis county, derive their important properties from the silicious marls of the bluff formation, which underlies this whole region. The rich soils of the region named, owe their fertility to the marls, sands and alkalies of the bluffs, and in these materials they have a source of perpetual fertility ever ready to be utilized by the subsoil plow.

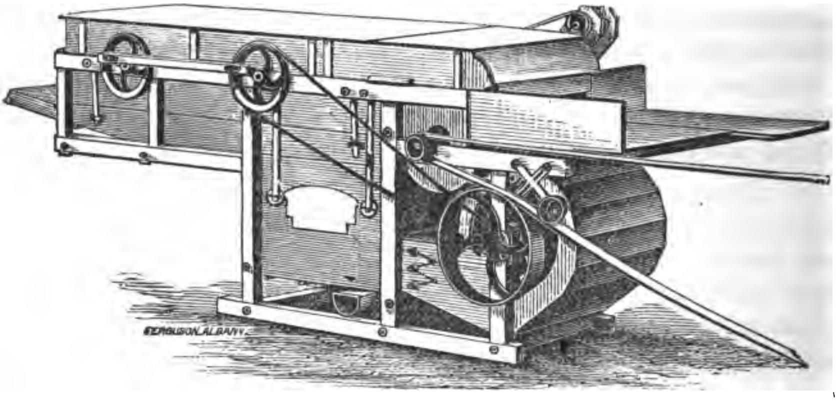
The magnesian limestone soil above described as covering 10,000,000 acres of Southern Missouri, owes its excellent properties to the lime, magnesia and alkalies derived from the underlying magnesian limestones. So the pine lands owe their sandy, warm and dry characteristics to the underlying sandstones. In the same manner it might be shown that every variety of soil in the State owes its leading properties to the underlying rocks, hence it is that a geologist can tell the character of the soil from the rocks beneath it.

Soils are often classified and named for the rocks from which they are derived; hence soils derived from limestone, are often called *limestone soils;* those from *magnesian limestones*, are named *magnesian limestone soils;* and those from peat and humus, are known as *peaty soils* and *humic soils.*

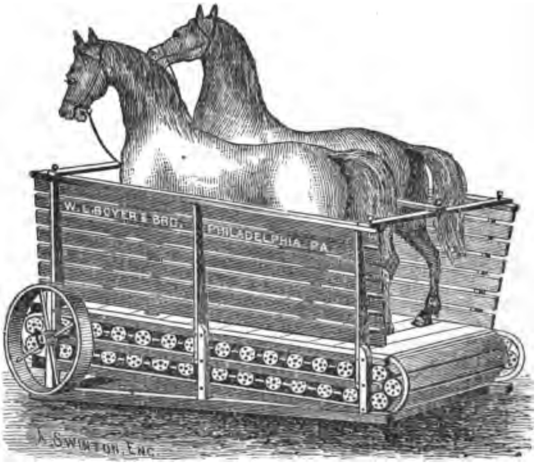
This class of names is most useful, since they denote the origin of the soil and designate its leading properties. The name *granitic soil*, indicates a soil derived from the decomposition of granite, and rich in the alkali of the feldspar.

Such are some of the common and useful modes of classifying and naming soils. The names thus derived are best known and most fully indicate the properties of the soils themselves.

Experiment in Threshing at Missouri Agricultural College.



COMBINED THRESHER AND CLEANER.


W. L. BOYER & BRO.
PHILADELPHIA, PA.
A. SWINTON, ENG.

TWO HORSE UNION RAILWAY POWER.

Until the present year, we have followed the usual practice of small farmers of hiring our grain threshed by those threshers who circulate from farm to farm for this purpose. But we have found this expensive and inconvenient, for, while waiting our turn, the grain is liable to injury from bad weather, vermin and loss by stacking; and the highest prices are often passed before the grain is ready for market.

It became too obvious that at present prices, we would have no margin of profits to cover such losses, and we are compelled to adopt some more economical system.

To this end, we have made the following experiments, which we publish for the benefit of others laboring under the same difficulties:

After comparing a large number of powers and threshers, we purchased the TWO-HORSE UNION RAILWAY POWER and the COMBINED THRESHER AND CLEANER, No. 2, manufactured by MESSRS. W. L. BOYER & BROTHER, PHILADELPHIA.

This outfit has now been running some 20 days on wheat and oats, without stoppage from breakage or accident; and all are well pleased with the results.

The Power and Thresher run with the ease and precision of clockwork, and with scarcely noise enough for lively music. We have never seen wheat threshed so clean and so perfectly separated from straw, chaff and cheat. It is believed we did not lose in straw and chaff a half pint to the hundred bushels, and we were unable to find a single grain of cheat or seed other than wheat, in a bin of 300 bushels.

With this outfit, three men and two horses can easily thresh and clean and sack from one hundred to one hundred and fifty bushels of good wheat in a day. We have sometimes run it up to 25 bushels per hour.

With this machine and Boyer's Three-Horse Union Railway Power, there would be no difficulty in threshing 200 bushels of good wheat per diem.

This trial has fully satisfied us there are many advantages in threshing our own grain with this outfit:

1. Our threshing costs less.
2. We can do the work better.
3. We can select our own time.
4. We save the labor and waste of stacking.
5. We avoid the injury and waste of weather and vermin.
6. We have the grain ready for the highest market.
7. We have a good horse-power for grinding and cutting feed, sawing wood, and for other farm work.

There can be no doubt that it will be more economical for our farmers, raising from 500 to 2,000 bushels of wheat, to use this most perfect but cheap outfit, and do their own threshing. Two or three neighbors might buy one in partnership.

We recommend the Power and Thresher above figured, from the good service it has done us.

There may be a better outfit for small farmers ; if so, we challenge and solicit a competitive trial from all who think they have better machines. Many of our farmers are waiting the result of our trial to buy.

Our whole system of threshing will be changed, and the *best small and cheap outfit (power and combined thresher and cleaner)* will find thousands of purchasers in this State during the next few years.

G. C. SWALLOW,
Dean Agricultural College.

County Reports.

ATCHISON COUNTY,

Situated in the extreme northwest corner, is probably destined to become the richest agricultural county in the State. The soil is considered inexhaustible on the rolling prairie, as well as on the bottom lands. The land is naturally underdrained from ten to twenty-five feet deep, except in a few springy sloughs, hence the land is less affected by either drought or extreme wet than is ordinary prairie land. About five-sixths of the county is prairie land, and one-sixth, or about 60,000 acres, timber. The timber is chiefly situated along the Missouri River, the river bluffs, and on the margins of the small streams. Timber grows very fast, and it is supposed that there is as much timber in the county to-day as there was fifty years ago, although most of the fencing and fuel used in the county so far, has been home production.

There are no public lands in the county.

At the close of the war probably not one third of the county was in cultivation, the farms being chiefly on the edges of the timber and along the streams. The greater part of the prairie land was in the hands of absent speculators. Probably over three-fourths of the land is now in cultivation, and about 80,000 acres remain in a state of nature. Improved land sells at from $15.00 to $40.00 per acre; wild land at from $8.00 to $20.00, most of it being held at $10.00.

A number of streams, rising in Iowa, traverse the county from north to south. These streams being supplied chiefly from springs, and having considerable fall, are available for water power. There is scarcely a quarter section of prairie land in the county that has not at least one running spring on it. Cattle have abundance of water everywhere, even in the dryest season.

The principal crop, so far, has been corn, which has been fed chiefly to cattle and hogs for the Chicago market, which was fairly remunerative till the hog disease made its appearance. Now, wheat, rye, barley, etc., are more extensively cultivated, and yield good crops. The average yield of the various crops with fair cultivation, may be stated as follows: Corn, 45 bushels per acre; wheat, 17; barley, 30; rye, 20; oats 40; millet, 30; flax seed, 14; potatoes, 200.

The live stock raised here is chiefly graded cattle and hogs. Enough horses, mules, dogs and sheep are raised for home use, but not for exportation.

A few farmers are turning their attention to sheep husbandry, since the failure of the hog crop, and, no doubt, with the introduction of good Cotswolds or Leicester stock, it will become a satisfactory branch of business. The tame grasses are now being sown extensively with success, and the dairy business is on the increase.

A few of our farmers have begun breeding Short Horn cattle.

Fruit raising is now admitted to be a very promising branch of industry. Apples, peaches, cherries, grapes and the small fruits grow and mature well on this prairie soil as well as in the timber, and orchards are being extensively planted. Apples and peaches, either in quality or appearance, cannot be excelled. Winter apples have never sold here for less than seventy-five cents per bushel, even when the crop was most plentiful. This county is supposed to be near the northern limits of reliable apple culture, and the great northwest is to be supplied. The land is naturally underdrained and apple orchards are very healthy.

There has been quite a stimulus given to the planting of groves and wind breaks, by the bounty given by the State, and by the commendable enterprise of many new settlers. On the east of the county a few years ago nothing could be seen but the bald, rolling prairie as far as the eye could reach; now the landscape is dotted or lined with young groves. The Osage orange hedge is extensively cultivated in the county, and will be THE fence in the future.

The county sustains eighty-three common schools, and a high school. The school fund amounts to $133,000.

The county contains about twelve thousand inhabitants.

AUDRAIN COUNTY.

The soil of this county is a dark, deep surface loam, very rich, resting upon a yellow, porous subsoil, varying in thickness from eighteen inches to two feet, below which is found clay, varying in texture in different localities, from a brittle, sandy, porous nature to genuine hard pan. The county is mostly prairie, probably seventy per cent., the remainder, timber of fine variety and well distributed over the county.

About two-thirds of the land is in cultivation. Principal crops—corn, oats, hay. The average yield of corn is about 35 bushels per acre; oats, 40; hay, 2 tons; wheat, rye, barley, buckwheat, and tobacco succeed well, but are not cultivated to much extent.

Improved lands are selling from $10.00 to $20.00 per acre; unimproved lands from $5.00 to $7.00 per acre.

The variety of stock produced consists of cattle, hogs, horses, mules, and sheep. There has been great improvement in cattle in the past few years, by the introduction of blooded stock; also of horses and mules. The best breeds of sheep are found in this county; but sheep raising is not profitable on account of dogs.

BATES COUNTY.

Bates county was settled as early as 1820, by a colony from Massachusetts, who located at Harmony. This colony came under the auspices of the Old School Presbyterian Assembly, for the purpose of civilizing the large and powerful tribe of Osage Indians, who then occupied the largest portion of the territory, now known as southwest Missouri.

The surface of the country is undulating, with successive ridges, and occasional irregular, conical mounds, rising above the surrounding prairies, giving graceful outlines of the horizon, with now and then a meandering stream, whose banks are skirted with timber, adding beauty and pleasure to the appearance of the country. The soil consists mostly of black loose loam, and produces all kinds of grain in abundance.

There is plenty of timber for farming purposes. Many farmers have planted extensively of hedge plants for fencing. Though the county is mostly prairie, there are bodies of good timber along the larger streams of water, especially on Grand river, Mormon Fork of the Maries-des-Cygnes, Miami, Mulberry, Camp Branch, and Panther Creek. The varieties of timber are hickory, oak, elm, honey locust, ash, linden and sycamore.

This county is well watered by running streams, and also living springs. Unfailing water can be obtained by sinking wells from 10 to 30 feet.

Corn, properly cultivated yields per acre 40 to 75 bushels. Average yield of wheat is 15 to 30 bushels. All kinds of vegetables grow well and yield abundantly.

Blue grass, timothy, orchard grass, and clover, are all well adapted to the soil of this county.

Castor beans and flax are extensively grown.

No vacant lands in this county, but good, unimproved lands are selling at from $3 to $8 per acre; average price at which improved land sells is $13 to $15.

Improved breeds of cattle, sheep and hogs have been introduced.

BENTON COUNTY.

Quality of soil—Varied. The prairie part is generally second-rate silicious. The timber lands, a mixture of argillo-calcareous, sometimes combined with silicious. A large proportion of the land is so stony as to be unfit for cultivation.

Quality of timber—Mostly inferior; consisting of five or six varieties of scrubby oak; hickory, walnut, ash, and sycamore. Along the water courses, and in large bottoms, the timber is of better quality.

About three-fourths of all the land in the county is timber, the remainder is prairie. Land in cultivation about one-eighth, mostly prairie.

Kind of crops cultivated—Wheat, corn, oats, flax, etc. Average yield per acre is of wheat, 10 bushels; corn, 25 bushels; oats, 25 bushels; flax, 6 bushels.

It is a good fruit country.

Public land—About one-eighth of the land in this county is unentered, consisting of the hilly lands upon the banks of the streams, Osage, Pomme-de-Terre, etc. Value of improved land about $8 per acre; value of unimproved lands from $1 to $5 per acre.

Variety of stock raised—Horses, mules, neat cattle, sheep and hogs.

Quality of stock raised—Horses rather inferior; mules the same. Improved breeds of cattle are being introduced to a limited extent; also, of sheep. Hogs have been greatly improved by the introduction of the Berkshire and Poland-China breeds. Short Horn cattle, Southdown and Cotswold sheep are also being introduced, and also the Norman breed of horses.

BOLLINGER COUNTY.

This county was organized from Cape Girardeau county, March 1, 1851, and is situated in the southeastern part of the State, and on the south side of the Ozark ridge of hills, which exempts it from frosts early in the spring and late in the fall.

The surface consists of table-lands, or "flat woods," ridges and valleys along the creeks and rivers in the north and middle parts, and swamp lands in the south part of the county.

The "flat woods" and ridges are a clayey loam, with a strong clay sub-soil, and are well adapted to raising small grains, grapes and fruits. The valleys are a strong, rich black loam, of wonderful fertility, and raises large crops of grain, grapes, etc. The swamp lands are low lands, and in some places are overflowed in the spring of the year, but are susceptible of being drained. They contain many fine farms, of very rich soil. There is no prairie land in the county.

In the western part of the county the timber consists of pine, oak, ash, hickory, gum, etc.; while in the eastern and middle parts, there is no pine; and in the south, poplar and cypress in addition to the various hard woods found in the north. In the valleys are found sugars, oaks, ash, walnut, paw-paw, etc.

About one-tenth of the land is in cultivation—near 55,000 acres; and the principal crops of the uplands are wheat, corn, oats, fruit, and grass; of the lowlands, corn, oats, grass, etc. The average of wheat is about 12 bushels per acre; oats, 25 bushels; corn, on uplands, 20 bushels, on bottoms, 40 bushels per acre.

Near the railroad, some farmers are turning their attention to small fruits, for the St. Louis market, of which the strawberry receives the most attention. The yield is about $300.00 per acre. One grower has five acres.

Peaches and all kinds of fruits do well, and nearly every farm has its orchard—many of which are just coming into bearing.

Irish potatoes yield about 100 bushels per acre; sweet potatoes, 300 to 500 bushels per acre; sorghum, about 100 gallons per acre.

There are but few acres of public land in the county; but about 40,000 acres of railroad land.

Improved farms can be had at from $5 to $40 per acre, according to location and improvements. Many good farms, a few miles from the railroad, are selling at from $5 to $10 per acre. Unimproved land, of good quality, can be had at from $3 to $10 per acre.

Considerable attention is paid to the raising of horses, cattle, hogs, sheep and mules. Notwithstanding the low prices all kinds of stock are bringing, farmers find stock-raising profitable, owing to the mild climate and good range furnished by the unimproved lands of this county.

Thoroughbred horses are not raised to any extent as yet, and but few blooded cattle—of the Short-Horn and Jersey breeds. Berkshire, Poland-China and Chester-White hogs are scattered all over the county, and will soon be the only hogs raised.

Great attention is being paid to the improvement of sheep, by the introduction of pure bred stock, consisting principally of Cotswolds, Southdowns, Leicesters, and a few Merinos.

Our ridges and hill lands are well adapted to sheep-husbandry; and as blue grass grows spontaneously and luxuriantly, and orchard grass and clover succeed well wherever sown, wool-growing, at present low prices, is found profitable.

Tobacco, of a fine quality, is raised to a small extent; yield, 800 to 1,000 pounds per acre.

Our manufactories consist of grist and saw-mills, wagon and agricultural implement factories, a stave factory, and a pottery.

The county is well supplied with good district schools and churches, and is out of debt and has a school fund of forty-three thousand dollars, so that her taxes are low.

Its facilities for shipping are the St. Louis, Iron Mountain & Southern R. R.—which has 19 miles of road in the county, and by wagon to the Mississippi river.

The county was first settled by North Carolinians and Tennesseeans, and by a German settlement, but has received accessions from Ohio, Indiana, and other States, and is now receiving a number of immigrants from Ohio, Indiana and Nebraska; and with its advantages of a mild, genial, healthy climate, cheap lands, good schools and churches, and its advantages for grain-growing, stock raising and fruit-growing, it holds out many inducements to immigrants, who are thrifty, hard-working and industrious.

JOSEPH H. GRANT.

MARBLE HILL.

BOONE COUNTY.

Boone county is situated on the north bank of the Missouri river, with a river front of over forty miles. The first settlement was begun in 1812, and the organization of the county was made in 1820. There are 410,000 acres of land in this county, of which about one-fourth is prairie and the remainder timber land.

Variety of timber, principally white oak; also, hickory, walnut, ash, cherry, hackberry, linn, maple, etc.

The soil is varied. The eastern side of the county, as also the northern, is mostly a black, rich soil, but a little colder and wetter than the timbered lands through the central and western portions of the county. That portion of the county adjacent to the Missouri river and for several miles back is rich, strong limestone land, very quick and lively, and splendid for wheat. The river bottom lands are very rich.

This county is well watered by numerous large and small streams passing through it in various directions, which renders it admirably adapted for stock and grazing purposes.

The agricultural productions are corn, yielding an average of 40 bushels per acre; wheat, 15 bushels; oats, 25 bushels; rye, 18 bushels; also, barley, timothy, clover, tobacco, etc. Grapes and fruits, especially apples and peaches succeed well. This is one of the best counties in the State for bluegrass, many farmers taking their stock pretty well through the winter on grass alone.

The farmers of this county have paid a great deal of attention to the improvement of all the various breeds of stock. Many of the best horses, mules and jacks in the State are found here. Especial attention has been given for the past twenty-five years to the introduction and breeding of short horn cattle, also Southdown and Cotswold sheep, the Berkshire hog, and recently, the Poland China, also. A few Alderneys have been introduced, but the preference is given to the short horn.

Improved lands are worth from $5.00 to $30.00 per acre; unimproved, from $1.00 to $10.00.

This county has paid much attention to the improvement of her roads, there being four good rock roads leading out from Columbia, the county seat, and aggregating 60 miles in length.

In Columbia is located the State University, which, in addition to its literary departments, has also a school of medicine, of law and of agriculture. Here, also, is located Christian Female College and Stephen's Female College.

CASS COUNTY.

This county contains 439,506 acres; is high, undulating prairie country, well watered and quality of soil is good. The prairies are mostly black loam around the points, and next the timber red loam, or what is termed mulatto soil. The soil is mostly underlaid by limestone, except in the southern part of the county there is some sandstone. Quality of timber medium. The timber is principally oak, hickory, walnut, elm, hackberry, linden, and some maple.

About six-eighths of the land is prairie. About two-thirds of the lands are in cultivation.

Corn and wheat are the staple crops. Corn, average yield per acre, about 25 bushels; wheat, from 6 to 27 bushels; oats, average yield, 30 bushels; flax, from 5 to 17, average yield, 11 bushels.

No public lands in the county. Improved lands held from $10.00 to $35.00 per acre, but none selling. Unimproved lands held from $3.00 to $12.00 per acre.

Variety of stock, horses, mules, cattle, hogs and sheep; horses and mules being bred mostly for draft. Some are bred for the turf and road. Cattle are being improved by short horns from some of the best herds in the land. Hogs are nearly all from the best herds in the land, of which the Berkshire, Poland-China and Chester Whites take the lead. Sheep are attracting some attention in the southern part of the county, Merinoes and Cotswold taking the lead. Other flocks are being improved, so that there are but few natives left.

Flax has gained a large per cent. of attention. It is estimated that over 75,000 bushels of seed have been shipped from this county this season. Jas. Dunn & Son of Pleasant Hill have handled 12,000 bushels.

Raising and manufacturing sorghum is becoming a branch of home economy, of which the Liberian and early Amber take the lead. On account of the dry season the quality of syrup is improved, the juice requiring less evaporating in boiling, there being less water and more saccharine in the stalk.

Clover and timothy are taking the place of prairie grasses for meadows and pastures. The tame clover and timothy meadows average two tons of hay per acre this season.

J. J. NICHOLS.

CAPE GIRARDEAU COUNTY.

The southern part of this county is generally level, the other portions more or less uneven, and along the Mississippi river the lands are abrupt and broken.

The county is heavily timbered and embraces the following varieties: Poplar, ash, cherry, maple, elm, walnut, oak, hickory, etc.

The county is well watered by small streams.

The soil is mostly sandy but a part is rich black loam.

Agricultural productions are corn, wheat, hay, barley and sorghum; hemp, flax, and broom corn are raised to a limited extent.

The various kinds of tame grasses do well. The average yield of wheat per acre is 15 bushels, of corn, 25 bushels; other crops a fair yield.

There are no public lands in the county.

Value of improved farming lands is from $8.00 to $30.00, and of unimproved from $5.00 to $20.00 per acre.

The variety of stock consists of horses, cattle, sheep, hogs, and cashmere goats. Improved breeds of these varieties have been introduced to a considerable extent. Of cattle, the short horn, Devon and Jersey; of sheep, the Cotswold, Southdown and Lincolnshire; of hogs, the Berkshire, Poland-China, Chester White and Jerseys.

CEDAR COUNTY.

Cedar county was organized as such on the 14th day of February, 1845. There are a number of our citizens who have lived in the counties of Green, Polk and Cedar, and that too, on the same farms without moving. Stockton, the county seat, is a little village, situated near the center of the county, (two miles west of Sac river.) It contains 400 or 500 inhabitants, with the usual number of business houses, dwellings, etc., for a town of its size, and is noted by immigrants as one of the best watering points in the south-west.

Cedar county is in the second tier of counties east of the Kansas line, and the fourth north of the Arkansas line; has an area of about 489 square miles, or 319,050 acres of land. The eastern half of the county is a timbered country, with only a few small prairies; the western is mostly prairie, with belts of timber along the streams, with now and then a beautiful grove on the high lands.

Soil—The soil is of three classes, known as the white ash, black loam and red or mulatto lands, all of which produce well in favorable seasons; but the two last named are best for all purposes; the quality of soil on the high table lands is usually white ash, and before cultivated, is covered with a thick mat of prairie grass that furnishes free pasturage to large herds of stock of all kinds. The ridges and most of the timber land is of the red or mulatto soil, and in some localities is set here and there with small patches of flint and limestone rock, rendering cultivation slow and tedious, though it produces very fine wild or tame grass, and is generally fenced for pasture; yet thousands of acres are not fenced at all.

The river and creek bottoms, together with a large portion of the valleys, are covered with a deep coat of black loam and sandy soil, and is considered the most valuable for tillage.

Crops—It must be borne in mind that agriculture is in its infancy here yet. The farmer labored under all the disadvantages of a new country, inconvenient to transportation, low price for all kinds of farm products, and as it furnished an easy support with the old-fashioned implements, no effort was made to secure the advantages of modern improvements. A new era is now breaking in upon us, old time ideas are giving way to the progress of science and the result is visible all over the county.

We produce nearly all the crops common to the northern and southern States, and most of them in great perfection, and will enumerate them at the proper time, with their respective average yield per acre, etc., etc.

There is perhaps one-third of this county enclosed by fence, with a less amount in cultivation, and yet fencing is on the increase, while the sound of the ax is continually heard in clearing the fields. There are many new frame buildings now taking the place of the "log cabin," that was hastily put up for immediate use at the close of the late war. However, these improvements are much retarded now, (fall of 1878,) on account of the great financial distress, together with the exceeding low price of farm produce.

Kind of crops cultivated, etc.—The vast difference in the mode of cultivation as well as the quality of our soil, will make it almost impossible to give a correct statement of the average yield of all kinds of produce; therefore will approximate as follows:

Name of crop.	Av. bu. pr acre.	Quality.
Corn	25 to 30	Generally good.
Wheat	15 to 20	No. 2 and 3.
Oats	30 to 40	Excellent.
Rye	25	
Buckwheat	25 to 30	Good.
Castor bean	10 to 20	
Flax	5 to 10	Medium.

Sugar cane and tobacco grow fine and are cultivated for home consumption.

All the different kinds of grasses that have been tried have proved a success; also all kinds of root plants, such as potatoes, turnips, etc., are extremely productive.

Timber—The area of timber land is about one-half of the entire county, embracing much of the very best tillable lands. The timber bordering the water courses, and in some places on the higher land (particularly where the fire has been kept out) is well grown and of a good quality, but a great deal of the up land timber is of an inferior quality. The fencing here is good, and principally eight feet rail, made from the following kinds of timber:

Black and white walnut, white and shell-bark hickory, common maple, coffee-bean, hackberry, ash, chincapin, wild cherry, sycamore, white and red elm, and all the different species of oak common to this latitude. There is also the following varieties valuable for their fruit, as well as furnishing an abundant pasture for the busy bee:

Red bud, paw paw, sassafras, birch, mulberry, persimmon, box-elder, hazel, plumb, sumac, and dogwood, also a large stock of the small fruits, such as the wild gooseberry, blackberry, raspberry, summer and fall grapes, furnishing as it does the best free range for swine in the United States.

There are no public lands in this county.

Improved farming lands—The average in this county can be had at $5 to $12 per acre, while the extremes will vary all the way from nominally nothing to $50 per acre, according to location, improvements, etc.

Unimproved lands—Of which there is an abundance, and can be had at $3 to $5 per acre, with easy payments, viz: One, two and three years time.

Stock—The number opposite each variety is the amount of stock as assessed in 1877.

The varieties are as follows:

Cattle, 14,617; Hogs, 22,424; Horses, 4,666; mules, 1,206; sheep, 11,843.

As will be seen from the foregoing statement, cattle and hogs largely predominate.

Quality—While it is true that our stock are superior to those of Arkansas and Texas, we are ready to admit that they fall far below the standard of what they ought to be, when compared with the stock raised north or east of us; however, this difference is more visible in the quality of hogs and cattle.

I might add that an interest in improved stock has been awakened within the last year or two among the stock raisers, that is likely to be seen and appreciated in the near future, by an increased number of fine stock and better prices.

Population, was in 1876, 9,912; number of school districts, 73; value of real estate, 1877, $860,023; value of personal property, $558,100; bonded indebtedness, none.

Railroads—Cedar county has no railroad traversing any part of its territory, nor has it any bonded or other indebtedness on account of subscription to any road during the last years of the speculative mania in county bonds. The honesty and sober common sense of the people kept the county clear of the meshes of the wily bond seeker. Cedar was set down as anti-railroad, denounced as old fogyish, non-progressive and suspicious. The facts are, that the people are not, and never have been, hostile to the legitimate construction of a railroad. The old fogy notions were that there should be a consideration for the bonds issued, more tangible than the promises of prospective millionaires. Hedged in, as we are, by counties involved in railroad indebtedness, this county suffered from being, geographically speaking, in the company of the unfortunate victims of visionary speculation. The immigrant, hearing the constant talk of swindles, high taxes, bond litigations, has hurried on in search of that never to be found spot, where the voice of the bond grabber has not been heard.

To those seeking homes in a new country; a land flowing with milk and honey; of clear streams and cool shades; balmy breezes and sunshine; of fruits and flowers; of a bright, pleasant and a promise of a glorious future, we say come now, while homes are cheap, and the field of selection broad; before railroads and the increase of population have placed land beyond your reach.

The writer is under obligations to J. T. Farris and E. C. Peters, for assistance in preparing the above report.

W. T. BAYLESS.

COLE COUNTY.

This county lies south of the Missouri river, at its most southerly point. Jefferson City being the county seat and Capital of the State; contains a population of 6,000, and is the most substantially built town in the west. Building materials of the best stone and brick are in great abundance, and so cheap that brick houses can be built at less cost than frame.

The county is bounded on the north by the Missouri river, on the east by the Osage river, on the south by Miller and west by Moniteau counties. The Moreau, a large creek, meanders through every township in the county, affording excellent water power in many places. The county has no prairie, but is one of the best timbered in the State, and is densely settled by a thrifty population, devoted largely to the raising of wheat. The up lands are of excellent quality, producing tobacco equal to Mason county, Ky., and wheat not surpassed in quality by any county in the Union. It is claimed, that there are more acres of rich bottom lands in Cole than any county in the State, most of which are in profitable cultivation. Cole county is one of the finest fruit growing districts in the west—apples, peaches, pears, grapes and all the small fruits grow to great perfection, not surpassed by any locality on the continent. Several deposits of coal and lead have been worked with profit, and these with other minerals abound in the county.

Jefferson City flour has a national reputation, and commands fancy prices where it is in the market. The milling facilities are excellent, and scattered conveniently throughout the county. Schools of the best character are maintained in every neighborhood, and the various religious denominations have their churches.

Improved lands can be bought from $5.00 to $25.00; unimproved from $3.00 to $15.00.

The average yield of crops in this county is, corn, 35; wheat, 15; oats, 35; barley, 20.

Timothy, clover and blue grass in Cole are not surpassed by any county in the west. Stock of every kind and of improved breeds are raised here, especially blooded horses; the records of the various fairs, State and county, showing more premiums to Cole than any other county.

CRAWFORD COUNTY.

This county is situated in the south-central part of the State; the county seat, (Steelville) being about ninety miles southwest from St. Louis. The St. Louis and San Francisco Railroad runs through the county east and west. The St. Louis, Salem and Little Rock Railroad runs north and south, diverging from the San Francisco road at Cuba and extending to Salem, Dent county.

The Meramec river traverses the county from southwest to northeast, with numerous tributaries, which, with the main stream, furnishes immense water power.

The soil of the lowland is a rich loam and gravel, upon which is grown some of the best crops of corn that can be shown in the State. The upland soil is a yellowish clay, on which is grown as nice samples of wheat as man need want to see. These uplands are also well adapted to sheep growing and fruit raising.

Fruit is always a sure crop, and of very nice quality. Quite a number of the citizens devote their time to orchards and grape growing, which they find very remunerative.

The most of the land is timbered, but very little prairie in the county, and that of a poor quality. The timber of the upland is mostly of the different varieties of the oak family; on the lowlands hickory, hard maple, walnut, red elm, etc.

The principle crops are wheat and corn, the former yielding, on an average about twelve bushels per acre, the latter about thirty-five. Hay, oats, potatoes, sorghum, and in fact all kinds of farm crops and garden vegetables, are grown with perfect success.

The census of 1870 gives 39,543 acres of improved land; 143,794 acres of woodland, and 800 acres of other unimproved land. Old inhabitants say there has been more advancement in the way of improving lands, planting fruit trees, introducing blooded stock, the use of improved farm machinery, etc., since 1870, than there had been from the organization of the county in 1829, up to that time, (1870.) There is considerable government land yet in the county, together with a large amount of railroad land, which last is now for sale very cheap. Improved lands are worth from $10 to $25 per acre, wild lands from $6 to $10 yer acre.

A few years since the long nose hazle splitter hog roamed at will and in large herds over this county, but now but few of them are to be seen, the gentlemanly little Bershire having driven them from their native soil.

The short horn cattle are on the increase, and in a few years the old native cattle, hogs and sheep will be entirely extinguished.

The mining interest is very extensive in this county, and furnishes a market for a large part of the surplus meat and grain. Coal is found to some extent, and iron and lead in large quantities. The Scotia iron furnace is one of the largest in the State. This furnace averages about thirty-two tons of pig iron every twenty-four hours running time, using in that time about twenty-four hundred bushels of charcoal. The iron has to be wagoned to Leasburg, on the St. Louis and San Francisco Railroad, a distance of eight miles. A large amount of the coal is burned on the company's lands, some, however, is bought of farmers, who use this mode to help clear and improve their lands. The company employ on an average about five hundred men, and over that number of horsesand mules. The Midland furnace is another large iron furnace, employing a large number of men and teams. Their shipping facilities are much better than the Scotia Iron Company, consequently do not employ as many men and teams. Their capacity is about twenty-four tons every twenty-four hours. There is also in the county a large number of iron banks, from which ore is shipped.

The educational interests are receiving increased attention, and new school houses and churches are being erected all over the county.

We have good soils and plenty of vacant lands for sale cheap, good climate, good markets, good schools, good churches, good society, plenty of minerals, and all seeking homes are invited to give Old Crawford county a call.

Our principal towns are Steelville, (the county seat) Cuba, Leasburg, Bourbon and Scotia.

Respectfully,

M. O. TAYLOR.

DOUGLAS COUNTY.

This county was organized in 1857, and named in honor of Stephen A. Douglas.

The face of the country is broken, being situated on the south side of the Ozark mountains, and it is well adapted to the growing of fruits and grapes.

Timber consists of the various kinds of oak, walnut, maple, hackberry, mulberry, linn and ash.

The county is well watered by various rivulets, streams and springs.

There are no prairie lands in this county.

The soil is generally good, being of a sandy clay upon the ridges or hills; that of the bottoms is of a darker and richer quality, producing fine crops of corn.

The productions are corn, wheat, oats, tobacco, sorghum, the growing of stock and fruits. The average yield of corn per acre, 40 bushels; oats, 30 bushels; wheat, 10 bushels; tobacco grows well and receives reasonable attention.

Vacant lands.—About three-fourths of all the lands are yet unsettled. About one-sixth of what is entered is in cultivation. Improved lands are worth from $3.00 to $5.00 per acre, and unimproved lands from $1.25 to $1.50.

Cattle, hogs, sheep and horses are of a medium grade, but little or no attention having been given to the introduction of improved breeds.

This county has an area of 495,360 acres.

FRANKLIN COUNTY.

This county is situated north of the Missouri river. It is bounded on the east by Jefferson and St. Louis counties; on the south by Crawford and Washington counties, and on the west by Gasconade county. It was organized from St. Louis county in 1818. It is the third in area and in population in the State.

This county contains 544,000 acres. Three-fourths of the uplands in the northern, and one-half in the southern part are tillable. There are about 200,000 acres of improved land. The remaining 344,000 acres are unimproved timbered lands.

The bottom lands, of which there are about 20,000 acres, are generally of a deep, sandy loam, the soil reaching to an unknown depth. They are noted for their fertility. It does not produce wheat well until after it has been under cultivation for several years, then the yield is from 25 to 40 bushels per acre.

The uplands, though not so productive, are well adapted to the raising of all kinds of grain, grasses and fruits that are usually grown in this latitude, of which we have this year an abundant crop, except apples and grapes.

The average price of improved lands is from $20.00 to $25.00; of unimproved uplands about $10.00, and bottom lands $18.00 per acre.

The corn and wheat crops of 1878 are not more than half crops. The average of corn about 20 bushels per acre, and wheat 12½ bushels; oats, 35 bushels; potatoes, from 48 to 50 bushels per acre; hay, 1½ tons per acre; sorghum is raised for home consumption.

Tobacco, though not extensively grown this year as formerly, is a full crop, the average, 1,200 pounds per acre.

Considerable attention has been given to the improved breeds of stock. Cattle—Short Horn and Alderney; sheep—Cotswold, Southdowns, Canada Comb and Leicester; hogs—Berkshire, Poland China and Chester Whites; all have given gratifying results.

Mineral lands—Its territory embraces at least two-thirds of the entire county. Notwithstanding that Franklin county furnishes the agriculturist and the horticulturist with inviting fields, the chief wealth consists in its mineral deposits, which taken at the lowest are simply immense. Lead is the chief mineral. Iron is found in great quantities. Zinc and copper are also found. Fire and potters clay is found in great abundance in the vicinity of Washington. Fire, lime, sand, building and gray marble stones are found in the county; some coal is found near the centre of the county.

Twenty-four flouring mills, nineteen of which are propelled by steam, and five by water power. Most of them have saws attached for sawing our oak, walnut, ash and hickory into fine lumber.

The county is watered by the Missouri, Boeuf, Burboise and Meramec rivers.

Facilities for transportation very good, there being 71½ miles of railroad in the county; Missouri Pacific along the northern limits, and the St. Louis and San Francisco passing through the southeastern section, forming a junction at Pacific with the former. These are among the most important lines of the country.

The last census shows the population to be 30,113; they are chiefly engaged in agricultural pursuits.

The free school system of the county is on a good basis. Most of the districts have good, comfortable houses, and a fair average of pupils in attendance. Competent teachers are accessible, and are now being employed.

The church property of the county is superb, and the citizens are not negligent of their christian duties.

JASPER COUNTY

Lies along the west line of the State, the northwest corner being one hundred and eighteen miles south of the Missouri river. The southwest corner is one hundred and forty miles south, and extending east thirty-one miles.

The county was first settled about the year 1833.

The principal business of the inhabitants of the county, previous to 1861, was rearing stock and the raising of wheat, to be manufactured into flour for the supply of the Indians on the western border.

There were some few efforts made to adopt better methods of farming, but the land yielded her bounty too easily to require much effort, and the farmers generally relapsed into the easy way of the country, and stock received little care and very little feed. The first good stock brought to the county were horses; for ease of living brings with it love of sport, and what sport more to the taste than horse-racing and wolf-hunting?

The vacant lands of the county were all taken, under the swamp land act, in 185—, and sold by the county court to two or three individuals, for the avowed purpose of keeping the Yankees and Dutch from getting them, and overrunning the county and destroying the range.

Immediately after the close of the war of the rebellion, the purchasers of these swamp lands having become financially embarrassed, they were transferred; and lo! they had passed into the hands of men to whom the money of the Yankee and Dutchman was as good as that of any one else, and they came—a few in '65, more in '66, and many in '68 and '69.

They each brought with them the ideas of the land of their birth, and the era of bull-tongue plows and brush harrows had gone—never to return; one by one came a grade cow or bull, a Norman or Clydesdale stallion, a Berkshire, Chester White or Poland China pig, brought in a wagon from Sedalia, the nearest point on the railroad—often brought from Iowa, Indiana, Illinois or Kansas. Sheep were driven from Illinois, but they were, alas! the straw that broke the camel's back, and many a farmer for long years of sheep farming. They were all diseased, and they died by the thousands the first winter, of scab and foot-rot, and to-day the Merino sheep is under a cloud, caused by the rascality of a few men from Illinois.

The settlers, after the war, required a better grade of implements for farming, and they were furnished by the agricultural implement manufacturing companies, for and in consideration of cash and notes well secured, and the farmer soon found out who pays for the implements with which he does his work. Some farmers became embarrassed in this way, and were obliged to sell a portion, and, in some instances, all of their farms. It was a hard lesson, but many, especially of the younger men, will learn to go slow, and will eventually be made better farmers; but the majority of this class will take no warning, and will only "go west," to repeat the same thing.

We have had three incursions of "grasshopers," in 1866, 1874, 1876. They always come with good appetites.

Quality of soil—Bottom land immediately along the rivers and creeks, about one-sixteenth of the land in the county; about one-third in cultivation—say 8,000 acres; corn land, fine. Second bottom—say 20,000 acres, 14,000 acres in cultivation; mostly prairie; rather close, clayey, and good wheat land; will raise good average crops of oats and corn. Black prairie land, good corn and oats land; rather light for wheat; inclines to be waxy. Gray prairie, fair for all crops, but extra for none, unless it be for timothy and sorghum. Red prairie land (cotton land of the South) inclines to dryness in appearance, and being generally gravelly, is not plowed very deep, but, with deep plowing, will produce any crop whatever, although rather light for wheat, the dirt blowing away from the roots, to some extent, in open dry winters. Black wax, confined to the bottoms along small prairie branches, gravelly and rocky. Probably one-twelfth of the county, principally ridge timber, will be in demand in future years for pasture lands.

Quality of timber—Poor. The good timber was wasted by the early settlers and the first settlers after the war. There will be much more timber in the county in 1890 than there was in 1870, except the large oaks and walnuts along the streams; about one-tenth of the county is timbered lands of all qualities, except good; three-fourths of the timber is in the southern half of the county.

The remainder of the county is prairie land, and cleared bottoms of all grades mentioned. The north half of the county contains by far the better farming lands. The Missouri and Western railroad seems to divide the good and poor lands, except that the Center creek bottoms are on the south.

Kinds of crops—Wheat, corn, oats, potatoes, (Irish and sweet) timothy, sorghum and flax.

Average yield—Wheat, 12 bushels; corn, 28 bushels; oats, 25 bushels; Irish potatoes, 75 bushels; sweet potatoes, 150 bushels; timothy, 1½ to 2 tons; flax, 6 to 7 bushels per acre.

No public lands, all taken under the swamp land act, making a school fund of $250.000, at 10 per cent. interest.

Value of improved farming lands, $10 to $50 per acre. Unimproved lands $2.50 to $12.50 per acre, according to quality and location.

Mining lands are held all of the way from $50 to $5.000 per acre, according to richness and stage of development.

Stock of all varieties and qualities; hogs generally good, all breeds of cattle and grades, Durhams, Natives, Texans and Arkansas.

Sheep, Merino, Cotswold, Southdown and their grades, and scrubs, all do well when the *dog* crop is not too good. Dogs are of all breeds, but the sheep-killer seems to be most bred.

Horses, a few of the better breeds, but generally only about common.

There are a good many of the better breeds of chickens and turkeys, some good ducks and geese.

Stockraising has not received the attention that it should, from the fact that the mines supplied a good market for grain, that the building of two railroads to Joplin has destroyed, thus leaving the farmers of the county with very few resources at the time of their greatest need.

Crops for 1878, will average about as follows: Wheat, 6 bushels; corn, 30; oats, 28; flax, 6 to 7; potatoes Irish, 50; sweet, 100 bushels; timothy, 2½ tons. Wheat was very much injured by the wet weather, from the time of sowing until harvest. Oats are rather better than an average; corn, also early Irish potatoes, good, late a failure, sweet potatoes pretty good; no wheat sown yet, (September 10th), and no prospect of rain.

Apples, one-fourth crop; peaches, one-fourth: pears full crop; berries very plentiful.

Joplin is a city of about 7,500 inhabitants, dependent on lead mining. Carthage, the county seat, is a city of about 6,500 inhabitants, dependent on the manufactories, wagon shops, flouring mills, woolen factory, plow factory, foundry and mining machinery, together with a large stock trade.

The villages are Sarcoxie, in the southeast part of the county, a stock shipping and general trading point; Avilla, not much of a trading point, in the eastern part of the county; Midway in the north side, local trade; Preston store, P. O., and blacksmith shop; Medoc in the northwestern part of the county, postoffice; Smithfield, trading and shipping point; Webb City, Oronogo and Scottland, mining towns.

The M. & W. R. R., runs through the county from east to west, and the J. & G., through the west side near the State line. The first connects with St. Louis, the second with Kansas City and Chicago. The question of restraining stock is being agitated to some extent, and the timbers is of so poor a quality, that 20 per cent. of the first cost of fences is required for repairs each year, which is an enormous tax, of which the man who owns a small farm, must bear the heaviest part.

LINCOLN COUNTY.

Lincoln county is situated on the Mississippi River. The face of the country is undulating, the soil is black loam, and in some parts a red colored, and very fertile and productive. It is well watered by several large streams and small creeks, affording abundant water for every purpose.

This is a well timbered county, and of a superior quality, consisting principally of the various kinds of oak, black and white walnut, elm, hickory, maple ash, mulberry, etc.

The agricultural products consist of corn, wheat, oats, rye, barley, tobacco, clover and timothy; and fruits, such as apples, peaches, grapes, apricots, etc.

The average yield per acre, is of corn, 40 bushels; wheat, 15 bushels; oats 45 bushels; rye, 8 bushels; barley, 18 bushels; tobacco, 800 pounds.

There are no public lands in this county.

Improved land is worth from $5.00 to $50.00 per acre, and unimproved from $3.00 to $30.00 per acre.

A good class of stock is grown in this county, embracing the various varieties of Short Horn Cattle; Southdown, Cotswold and Merino sheep; Poland China and Berkshire Hogs, have been extensivelyintroduced and profitably handled in this county.

LIVINGSTON COUNTY.

The surface of this county is undulating and rolling. The northeast portion of the county is about one-third timber, of an inferior quality, and two-thirds prairie of good quality, with dark, loamy soil. The northwestern portion of the county is about half timber of good quality, and the other half is prairie, also of excellent quality. The remaining portion of the county is about equally divided between prairie and timber, both of excellent quality.

The timber consists of the usual varieties of oak, hickory, elm, hackberry, honey locust, cottonwood, maple, walnut.

The agricultural products are corn, with an average yield of 40 bushels per acre; wheat, 13 bushels; oats, 35 bushels; rye, 12 bushels; also tobacco, sorghum and the various kinds of grains do well.

Improved land is worth from $12.00 $35.00 per acre; unimproved lands are not selling, but are held at merely nominal prices.

There is great room for improvement of stock in this county, although a few Short Horn cattle have been introduced; also quite extensively the Poland China and Berkshire Hog, and Southdown and Merino Sheep.

This is a well watered county, the west and east forks of Grand River forming a junction near the centre, besides other smaller streams.

MADISON COUNTY.

The surface of this county is generally broken and hilly, is rich in minerals, especially iron ore.

The celebrated mine La Motte is here, about 4 miles from Fredericktown, which is the county seat, and located midway the county, and some 30 miles west of the Mississippi river, and by railroad about 100 miles south of St. Louis.

This county has several creeks running through it, toward the south, some of which furnish good water power.

The flats or ridges, between these creeks, are often rich and fertile, producing fine fruits, and excellent blue grass and clover for pasturage. The bottom lands on these creeks are sometimes extensive and exceedingly fertile, producing from 50 to 75 bushels of corn per acre, and of wheat from 15 to 30 bushels.

The ridges have a red and yellow clay soil, the bottoms are black and sandy. Timber of almost every variety and quality is found well distributed over the county, and in abundance for every needed purpose, also stone of good quality and variety for building purposes. Excellent marble is found in abundance.

Iron, lead, copper, nickel, cobalt, zinc, etc., are found in this county in paying quantities to work. Promising deposits of silver are found in different parts of the county, and furnaces are being erected nine miles west of Fredericktown, for smelting the silver ores. Both water and steam power will be used for preparing the ores for the furnace.

About one-sixth of the land in this county is in cultivation, producing good crops per acre, of corn from 20 to 75 bushels; of wheat, 5 to 30 bushels; of oats, 10 to 40 bushels; of rye, 10 to 20 bushels; of timothy, 1 to 1½ tons.

Improved lands are worth from $5 to $30 per acre, and unimproved from $3 to $15.

All the varieties of stock are raised in this county for market, but very little enterprise or energy has been displayed by the people in the improvement of their stock, by the introduction of the more improved breeds. A few Short Horn cattle, Bershire and Poland China hogs, Cotswold and Southdown sheep are occasionally found within the county.

MONITEAU COUNTY.

Moniteau county lies mostly on high plateaus between streams, and, of course, has a great variety of soil, but on the whole a good average, and very kindly in cultivation. A very large amount of valuable White Oak timber clothe the hills in the northern part of the county. Oaks, of all the usual varieties, walnut—white and black, hickory and elm, constitute the rest of the valuable timber.

The county is very nearly equally divided as to prairie and timber.

The land in cultivation is estimated at three-fourths of the whole.

The principal crops are, in the order mentioned, corn, wheat, oats, timothy, clover, tobacco:

AVERAGE YIELD.

Corn	30 bushels per acre.
Wheat	10 bushels per acre.
Oats	20 bushels per acre.
Timothy	1 ton per acre.
Clover	2 tons per acre.

No public lands in the county.

Improved lands are words from $5 to $25 per acre, according to improvements and quality of land. Unimproved lands rate at about one-half these figures.

We raise a great deal of stock, in value as named: Horned cattle, horses, mules, hogs, sheep. A great desire has been manifested, for some years, to improve the quality of all the different breeds of stock, particularly cattle and hogs.

A great many thoroughbred cattle, of good and even fancy families, are now bred annually in Moniteau county, with great profit to the breeders, and still greater profit to the farmer who is improving his breeds.

Durham or Short-Horn cattle are exclusively desired by our people, as we breed mainly for beef, and find them also splendid milkers.

Great attention is also paid to introducing improved hogs—Berkshire, Poland-China, and in fact, all the popular breeds; but mainly Berkshire, because they are considered hardier, and the qualities of the breed seem to perpetuate themselves longer.

Our great lack in Moniteau, is proper cultivation of the soil. If our people could be induced to cultivate half as much and till it *well*, it would greatly improve the condition of our farmers. Some day, when necessity compels us, we will imitate the thrifty habits of our plodding German neighbors—save our home-made fertilizers, clover our worn-out fields, and make our lands rich and productive; and if we could only imitate, too, their saving, economical habits, "hard times" would have but little effect upon us.

Very respectfully yours,
R. Q. ROACHE.

MARION COUNTY.

Marion county, Missouri, was organized December 23d, 1826, and is situated on the Mississippi river, in the northeastern portion of the State. The county contains 280,509 acres of land, which, in fertility, ranks second to but few in the State. Her advantages are numerous, among which are her home markets and the facilities for transportation, by river and railroads, making this county one of the most desirable in the State. Being also noted for her many streams, and fine springs of living water.

Originally her lands consisted of prairie and timber, promiscuously divided, of which one-third was prairie, and two-thirds timbered. The number of acres improved at this date, is about 140,000; of this number there are, say, 90,000 acres in cultivation, producing all the cereals and fruits usually cultivated in this latitude.

Her timber is various: such as elm, wild cherry, walnut, hickory, pecan, linn or bass-wood, maple, and the different varieties of oaks. All of which grow very large and vigorous.

Principal crops cultivated, are:

Corn, average per acre	35 bushels.
Wheat, average per acre	15 bushels.
Oats, average per acre	25 bushels.
Rye, average per acre	15 bushels.
Barley, average per acre	30 bushels.

Hemp, average per acre	1,000 pounds.
Potatoes (Irish), average per acre	75 bushels.
Tobacco, average per acre	800 pounds.

Public lands—none.

Value of improved land per acre, $5.00 to $50.00.

Value of unimproved land per acre, $2.50 to $15.00.

Variety of stock raised: Horses, mules, cattle, hogs and sheep. Quality, above the average and rapidly improving. Of the improved herds introduced, the Short-Horns and Devonshires are most extensive; of hogs, the Berkshire's and Poland-China's are most popular, next, Chester-White's; of sheep, Southdowns and Cotswold.

Assessment of 1877:

Real estate, value	$3,095,977
Town lots, value	2,641,635
Horses, value	234,785
Mules and Asses, value	70,770
Cattle, value	274,675
Sheep, value	18,430
Hogs, value	92,192

The county cannot be surpassed for producing grass of all kinds, blue grass growing spontaneously.

MORGAN COUNTY.

Morgan county is situated mainly on the south side of the Missouri Pacific R. R., on the divide between the La Mine and Osage rivers.

The surface is mainly high, beautiful, undulating prairie land, composed of dark, decomposed, vegetable matter, yellow clay and gravel.

There are quite a number of streams and creeks in this county, furnishing abundant stock water. Those on the south side of the divide flowing into the Osage river, and those on the north side into the La Mine. There are also some very fine large springs in the county, furnishing sufficient power for two or more grist-mills.

The northern part of the county is about one-third prairie, skirted with good timber, consisting of the various oaks, walnut, maple, hickory, cherry and black locust. About one-half of the entire county is in cultivation. The agricultural products are corn, yielding per acre ———; oats, 40 bushels; wheat, 15 bushels; hay, fruits, etc. There are no public lands in the county. Improved land is worth from $10 to $20 per acre; unimproved rate from $1.50 to $5 per acre.

All the improved breeds of stock are being very generally introduced. This county is also very rich in mineral resources, having in operation several mining companies, operating more or less extensively. Public schools in every district, and in good condition.

MISSISSIPPI COUNTY

Is situated in the southeastern part of the State of Missouri, opposite the mouth of the Ohio River, about 280 miles south of St. Louis. It is bounded on the north, east and south by the Mississippi River, on the west by Scott and New Madrid counties. It contains about 260,000 acres. The soil is, mostly, what is called sandy loam; in the river bottoms, there is some clay and black land, such as is usually found in river bottoms. The soil is generally very deep, except in the very high, sandy portions. There is not a hill or native rock in the county. The surface is level, with bayous sufficient to furnish natural drainage. There is no lack of timber of the best varieties, such as walnut, cypress, the various kinds of oaks, hickory, ash, elm, vast quantities of sweet gum, and other varieties of timber, that would be useful if there were any manufactories in the county to work them up. There is but little prairie land in the county, all of which is in cultivation. There is in cultivation only about 35,000 acres, leaving about 225,000 unimproved, a large portion of which is as good land as there is in the county. The soil will produce almost anything that will grow in this latitude, though corn and wheat are the principal crops raised for market. In 1877 the yield of corn was from 40 to 112 bushels per acre. Wheat averaged about 20 bushels per acre. This year (1878) wheat was nearly a failure on account of drouth, rust and insects, yielding from 2½ to 20 bushels per acre, generally of very poor quality. The corn crop will be light in consequence of drouth, through latter part of July and first of August. All other crops doing well.

No public lands in the county.

Improved farms can be bought for from $5 up to $50 per acre. Unimproved lands are worth from $2 to $20 per acre. The stock raised in this county is principally scrub-stock. There is more improvement in hogs than any other stock, there having been some Berkshire and Poland-China introduced into the county, which has been of great advantage to hog raisers. Few horses or mules raised, and but few cattle. There is no one in the county who gives much attention to stock, though the wild range is very good eight months in the year.

The location of Mississippi county, with the Mississippi River bordering it on three sides, and divided from north to south and east to west by railroads, is destined to be, at no distant day, one of the leading agricultural counties of the State. The soil is unsurpassed; the market facilities are excellent, the climate mild, and as there is more land opened up for cultivation, health improves. It has no railroad or bonded debt, consequently, taxes for county purposes are light. Industrious men will find this a good place to engage in almost any enterprise, with an assurance of success. All such are invited to come and settle.

NEWTON COUNTY.

This county is situated in the southwestern part of the State, adjoining the Indian Territory, and contains about 400,000 acres.

The surface of this county is somewhat hilly, with about equal divisions of prairie and timber land. The soil in the bottom lands is rich, alluvial, and very productive; that on the uplands is a rich limestone; that of the prairie lands is generally of a dark color, in some places a mulatto loam, with a reddish clay subsoil.

The county is well supplied with springs and water courses.

The prairie lands stand drouth equally as well, or better, than the bottom lands, and increase in productiveness from cultivation.

The quality of timber is not the best, but is sufficient for all local purposes.

About one-third of the lands are in cultivation, yielding per acre, of wheat, 10 bushels; of corn, 33 bushels; of rye, 12 bushels; sorghum, 75 gallons; Irish potatoes, 100 bushels; sweet potatoes, 250 bushels, tobacco, 800 pounds; tame grasses do well.

No public lands.

Improved land is worth $10.00 per acre; good unimproved land from $5.00 to $7.00.

The variety of stock consists of horses of an ordinary class, cattle —natives, except about two car loads of Short Horns, purchased and brought into the county within the last two years; the Berkshire and Poland China breed of hogs, and a common stock of sheep, with the exception of a few Cotswold and Southdown sheep, introduced recently.

Fruits of every kind are successfully grown here.

The rocky hills along the water courses are covered with wild grass, and will afford abundant pasturage for years to come.

Google

The lead mines of this county, which seem to be inexhaustible, bring in annually a large amount of money.

The climate is excellent—mild winters and pleasant summers.

PHELPS COUNTY.

The surface of Phelps county consists of rolling ridges, with soil rather thin, and bottoms with rich vegetable mould.

The timber is ample for all the wants of the people; chief in quantity is oak, of which there is almost every known variety. This is confined chiefly to the up lands and their slopes, being mixed sparsely with other varieties. In the bottoms are found walnut, butternut, hickory, soft maple, elm, gum, birch, mulberry, hackberry, sycamore, plum, pawpaw and other varieties.

There is very little prairie in this county, perhaps from two to five per cent.

The county has an area of 644 square miles, 412,170 acres, and according to the census taken in 1875, there was 35,000 acres in cultivation; there is at this date about 13 per cent. in cultivation.

Average yield of corn, per acre 30 bushels; wheat, 10 bushels; rye, 15: oats, 30; potatoes, 75; hay, 1½ tons.

Very little public land in the county.

Cultivated lands range in price from $10.00 to $20.00, and uncultivated from $3.00 to $5.00 per acre.

Improved stock have been introduced to some extent; horses, mules, cattle, sheep and hogs are raised profitably.

PIKE COUNTY.

The surface of this county is gently undulating, the central and western portion being chiefly prairie, the soil of which is a rich, dark loam, and very productive and fertile. The bottom lands on the Mississippi are, when not overflowed, as they are subject to in wet years, very productive.

The county is well watered by a large number of running streams and creeks. Several mineral springs are found here.

Two-thirds of the land is a rich, black loam; the remainder is a clay soil, but all is good producing land.

The timber is of good quality, embracing the various kinds of oak, hickory, walnut, elm, cherry, ash.

The county is about equally divided as to timber and prairie. About two-thirds of the whole is in cultivation.

The agricultural products are of corn, 35 bushels per acre; of wheat, 12 bushels; oats, 25 bushels; rye, 25 bushels; and tobacco and fruits, especially apples.

The quality of stock raised is very good and still improving. There are no less than twelve herds of Short Horn cattle in this county, besides Cotswold, Southdown and Merino sheep, and the usual varieties of hogs.

James H. Kissinger, an extensive breeder of Short Horn cattle, and J. E. Stonebrecker, of Cotswold sheep, are residents of this county.

PULASKI COUNTY

Contains 504 square miles; 322,560 acres of agricultural and grazing lands. Not more than one-tenth of the land of the county, however is susceptible of cultivation.

The river and creek bottems are very fertile, producing fine crops of corn, wheat, oats, rye, potatoes, sorghum and grass. The ridges or uplands are not so good, almost totally unfit for cultivation; though there are some uplands in this county that produce the finest wheat, and some as fine tobacco as is produced any where; tobacco is not grown here at all as a crop. The river bottom lands are mostly a black, loamy soil, slightly mixed with sand and sometimes gravelly; creek bottoms are all more or less gravelly. The uplands, when clear of rocks or gravel, have a yellow or brown clay soil.

The river bottom timber is good. It consists of various kinds of oak, black and white walnut, hickory, elm, cottenwood, ash and sycamore; the undergrowth, papaw, spicewood and hazle, etc. The upland or ridge timber is plentiful, but not good, consisting of oak, hickory, post oak, blackjack. No prairie lands in this county; not more than one-twentieth of the lands in cultivation.

Principal crops cultivated are corn, wheat, oats and timothy, average yield of corn, about 30 bushels per acre; wheat, 12 bushels; oats, 30; grass, 2 tons per acre; about one-half the lands in the county belong to the government, and the St. Louis and San Francisco railroad company.

Price of government land inside of railroad limits, is $2.50 per acre, outside $1.25; price to actual settlers, under homestead act, 17½ cents per acre.

The railroad company owns some bottom and some very good upland; they they sell at various prices, ranging from 50 cents up to $5.00 per acre, owing to quality and location. They are selling on seven years time, payable in installments.

All the fruits grown in this latitude succeed remarkably well. On the upland there has not been a total failure for several years. The culture of the various kinds of grapes, in a small way, shows that the business of wine making would be a success, if carried on largely.

The face of the county is very broken, sometimes mountainous, rocky cliffs, rising to the height of 250 feet.

This county is finely watered, there being found here some of the finest springs in the State. Principal streams, Gasconade, Big Piney, Roubidoux, Ozark Fork, Bear Creek, etc. Most of these streams have very fertile bottoms, sometimes subject to overflow. Waters of these streams being so clear, any one can see a small pebble in the bottom, where the water is eight or ten feet deep.

A large portion of the county being owned by government, the price of improved land is low, from $1.00 to $10.00; unimproved land not selling.

The cattle, mostly common stock, though some good Short Horns are found occasionally. Hogs—the long-nosed hazel splitter has disappeared from the land; Berkshire and Poland China have taken their place. Horses fair, though the stock is very common. Sheep would succeed well in small numbers; large numbers soon become unhealthy. They do well on the range nine or ten months in the year without feed.

The St. Louis and San Francisco railroad running through the northern part of the county, gives a fair outlet for the surplus production of the farmer.

There are no fertilizers used on nine-tenths of the farms; one-tenth of the farmers use common barn-yard manure on corn and wheat land; no other kind of manure used.

Cotton has been tried here, but does not succeed well.

Cattle is perhaps the best paying stock the farmer can raise, as the grazing is as fine as any place in the State, and as there is such a large portion of the county unfit for cultivation, the wild grass can be well depended on for years to come. Cattle are very healthy.

No improvement in sheep to any extent, only one or two Cotswolds (bucks) in the county.

PUTNAM COUNTY.

This county contains 331,487 acres of land. In common with other portions of our noble State, this county is suffering from the unsettled condition of the National finances. There is a gloom and despondency resting on the agricultural and laboring portion of our community, caused by the great scarcity of the circulating medium of currency money. All productive enterprises are languishing, but notwithstanding discouragements, our county is improving finely.

Thousands of acres of virgin soil have been fenced and broken the last season, and a corresponding area of lands, heretofore subdued, have been sown in timothy and clover, which do well here, and are as profitable to raise as any crop of grain, the seed being marketed, and the hay fed to cattle, for when properly secured it makes good cattle feed. It should be stored soon after cutting, and left to bleach and lose the seed, waiting for the threshing machine.

Lands rate very low now, owing to the scarcity of money. Improved farms can be bought at $6.00 to $12.50 per acre, and unimproved at $2.00 to $5.00. The soil is fertile, gently rolling, and mostly prairie, but with plenty of timber for all purposes. The timber is mostly on and near the streams in the west end. Good white oak rails are worth $2.00 to $2.25 per hundred in the timber. In the east end timber is more abundant, and the soil is underlaid with excellent coal, which sells at the mines at 5 cents per bushel. In the west end of the county grass is abundant, both for grazing and mowing purposes, with plenty of water. There are large herds brought here every spring to fatten on the grass, growing on the lands owned by non-residents.

Fruit of all kinds congenial to this latitude, such as apples, pears, peaches, plums, cherries and grapes, and the other small fruits do well here. There has not been an entire failure of peaches in the last thirteen years.

Water is abundant, and easily accessibly, wells being from four to thirty feet deep, but mostly under twenty.

This is a very healthy county for man and beast, but this season, owing to the extreme dry weather and consequent generating miasmas, there were a few cases of fever and ague, mostly confined to the proximity of stagnant waters.

Our county is well provided with schools of a good grade; and in nearly every district is seen a neat frame house of good size, well furnished with the latest improvements, in which schools are taught four to nine months in the year.

Society is good. The different sects are well represented, and personal opinion and speech are perfectly free, no one presuming to dictate to another his religious or political belief.

The Burlington & Southwestern railroad traverses the county from the northeast to the southwest, with a main line surveyed from Unionville, the county seat, to St. Joseph, to pass through or near Central City.

RANDOLPH COUNTY.

This county embraces an acreage of 307,677 acres.

It is situated on the divide between the Missouri and Mississippi rivers.

The land in the eastern portion of the county is chiefly prairie, and comprises about one third of the county, and is well adapted to farming and stock raising. There is also some very valuable and fertile prairie lands in the western portion of the county.

Timber—elm, hickory, the various kinds of oak, cottonwood, hackberry, maple, ash, walnut and cherry.

The timber is well distributed over the county, and in abundance for agricultural and manufacturing purposes.

There is about three-fourths of the land in cultivation and pasturage.

The crops cultivated—Corn, wheat, oats, rye, timothy, blue grass, clover and tobacco.

Average yield per acre—Corn, 35 bushels; wheat, 12 bushels; oats, 25 bushels; rye, 20 bushels; tobacco, 1,000 pounds; timothy, 1 ton.

The various kinds of fruit succeed well, especially apples.

There are a few hundred acres of swamp lands in the county. Improved lands sell at from $8.00 to $30.00 per acre, and unimproved from $3.00 to $15.00.

Great improvement has been made in stock, especially notable in hogs, sheep and cattle. The Berkshire, Essex, Poland, China and Chester White hogs, and Lincolnshire and Southdown sheep, and Short Horn cattle being well distributed over the county.

The educational facilities of the county are good. Besides Mount Pleasant College, located in Huntsville, and several graded schools, almost every school district in the county is supplied with a good, substantial school house.

Facilities for transportation almost equal to any in the State, there being five lines of railroad leading into the city of Moberly, which is situated near the center of the county.

REYNOLDS COUNTY.

This county is located in the southeastern portion of the State, and contains 458,187 acres, about one-tenth in cultivation. The surface is somewhat irregular and uneven, with here and there bottom lands, with rich alluvial soil.

The hills are generally very heavily timbered, consisting of oak, hickory, pine, ash, walnut, maple, hackberry.

This county is well watered by several large streams. It contains several thousand acres of swamp lands.

The leading agricultural staples of the county are wheat, corn, oats —the two latter are chiefly fed to stock. Also, potatoes, buckwheat, peas, grasses of all kinds, and tobacco of a superior grade, grow well here, as the variety of soil is well adapted to each. The average yield this year per acre is, of wheat, 8 bushels; of oats, 30 bushels; corn, above an average.

There is an increase of all kinds of stock, this year, of at least 10 per cent., though, owing to the immense outside range, there has been but little attention paid to improving the various breeds.

Number of town lots, 256; valued at $7,320. Valuation of personal property is $175,181.

Reynolds county contains large quantities of mineral wealth.

There has been some immigration into the county, and yet there is room for much more.

The nearest shipping points are Piedmont, Millspring and Anapolis. All products are shipped to St. Louis.

SALINE COUNTY

Is situated on the south bank of the Missouri river, and contains 458,095 acres.

The bottom lands which, in many places, are as much as four miles in width, are covered with very fine, heavy timber.

The larger portion of the remainder of the county is prairie, with more or less timber skirting the streams.

The soil is a deep, rich, black loam, underlying which is found a porous sub-soil.

This county is well watered by numerous large running streams, besides a great number of fresh and salt water springs. There are also some mineral springs, which are very valuable for their medicinal properties, the most noted of which are the Sweet Springs, near Brownsville.

Agricultural products are wheat, corn, oats, rye, Hungarian grass, blue grass, clover, timothy, etc. Formerly there were immense crops of hemp grown in this county, but of late years it has given place almost entirely to the other productions. The wheat crop of this county for the year 1878 was an average crop, but the corn was not so good as usual. Oats and other crops were about an average. The peach crop was light, and the apple crop very short, though usually apples do remarkably well here.

The assessor's book for 1878 shows the following property listed:

Horses	10,943	Valued at	$482,886
Mules	4,363	"	194,659
Cattle	23,623	"	355,206
Sheep	19,420	"	28,015
Hogs	47,638	"	111,750
Money			983,110
Other personal property			493,000

Marshall is the county seat.

SCOTT COUNTY.

Scott county is situated on the west bank of the Mississippi river, about 150 miles south of St. Louis, and about 25 miles north of the mouth of the Ohio river. It is bounded on the north by Cape Girardeau county, on the west by Stoddard county, on the south by Mississippi and New Madrid counties. It has a river front of 25 miles, with numerous fine landings. It is traversed from east to west, near the center, by the St. Louis and Iron Mountain Railroad, and near the southern border by the Cairo, Arkansas and Texas Railroad, giving its inhabitants the very best facilities for shipping and travel.

The county was organized in the year 1822, by being cut off from New Madrid county. It contains a population of about 9,000 persons, about 350 of whom are colored. It has an area of 258,198 acres of land, which may be divided into five distinct qualities of soil, about one-fourth of the county being high, rolling land, almost all lying so that it can be profitably cultivated, the soil being clay, and produces wheat of the very choicest quality.

Barley and oats do very well here also, but the soil is so peculiarly adapted to the growth of superior wheat, that three-fourths of the land is annually sown in this staple. Clover grows well on this soil, but is principally used as a fertilizer. Nine-tenths of this land is in cultivation, the remainder reserved for timber, of which there is sufficient for present purposes. This land is valued at about $25 per acre; about an equal amount of the remainder of the county is what is called sandy woods, the soil being almost pure sand. It has its peculiar good qualities, being excellent land for early crops of all kinds. The sand gets warm early in the season, and is, therefore, excellent for early market gardens, especially for melons. About 100 car loads of which were shipped this season from one depot alone.

Sugar cane or sorghum, grows well here, and is quite a valuable crop. Corn and wheat, both grow tolerable well here, but the soil gets too hot late in the season to make good crops of either. The stock pea grows luxuriantly when sown on the corn land, together with the splendid wild grass, furnishes sufficient winter pasture to keep all kinds of stock in good condition during the whole winter. Value of land about $5 per acre.

Another portion which deserves especial mention, is what is called Richwoods, embracing about one-eighth of the county; the soil is black, sandy loam, of the very best quality; corn grows to perfection on this land, that being the principal crop. The soil is loose and easy of cultivation, so that one hand and team will cultivate 40 acres of corn. Wheat does well here, but corn is considered the best crop. This is the garden spot of the county; everything that it takes to make land valuable, abound here.

The next tract in importance is the Mississippi river bottom, or as it is called Tywapity bottom. This is a strip of land lying along the bank of the Mississippi river, from 3 to 8 miles wide, and 15 miles in length. Corn and the different variety of grasses grow to perfection here, wheat does also tolerably well, the greater portion of this land was covered with water by the overflow of 1844, 1851 and 1858, leaving immense deposits of the richest soil, rendering it easy of cultivation and capable of producing very large crops.

Last, but not least, is a tract of land known as the Swamp, lying principally on the western boundary of the county, on Little river. The soil is very much the same as that of Richwoods, but is traversed by numerous sloughs which are too wet for cultivation, now, but are entirely susceptible of drainage, and when drained, will be our best grass lands. Large tracts of unimproved lands may be found here, furnishing the finest timber and summer and winter pasturage for stock. Many good farms are now opened on the ridges, and great quantities of dry land suitable for cultivation, are yet in timber.

Good water may be found in the level country by digging wells, or, as is now the most common method, by driving pumps to the depth of from 15 to 25 feet.

There is an abundance of fine timber in all parts of the county, but particularly in the lowlands, consisting of all varieties of the cypress, oak, ash, gum, hickory and pecan. Great quantities of fine walnut and poplar timber has been removed, leaving very little of either, but the oak and cypress are inexhaustible.

We have eight prosperous little towns within our county. Commerce, the county seat, situated on the Mississippi river, Burton and Hamburg on the northern portion, and Morley, Sylvania, Blodget and Diehlstadt, on the St. Louis and Iron Mountain and Belmont Railroad, and Sikeston, in the northern part of the county, on the Cairo, Arkansas and Texas Railroad, all striving to be cities.

In conclusion, I will say, as an encouragement to immigrants, that we have an industrious, law-abiding population, encouraging all the institutions of religion, education and temperance. We will welcome among us all persons as citizens, coming from every quarter of the globe.

Our county is entirely out of debt, having a surplus of money in our county treasury. No railroad or other outstanding indebtedness, and the rate of taxation low.

SCHUYLER COUNTY.

The quality of soil in this county is of almost every description, but principally a black, sandy soil, inclined to be heavy. This is found on level prairies, ranging in depth from six to ten inches. The rolling prairie and timber land has a deeper soil, also of a sandy nature, except the white oak timber soil, which is thin and heavy, producing good fall wheat and clover, good crops of all different kinds of grain, grasses and vegetables, suited to our our climate.

Quality of timber—There is a great variety of timber, principally white oak, which is being destroyed as fast as the railroads can use it for ties and bridge timber. There is pin oak, burr oak, white shell bark and black hickory, white and red elm, cottonwood, black walnut, soft and hard maple, cherry and buckeye. The white oak and black walnut timber is of very good quality, will average with almost any other county. Proportion of prairie about one-third of the county, nearly all in cultivation. One-half of the timber land under fence and in cultivation.

Crops—Corn is king, then timothy and clover, oats, wheat and potatoes. Average corn, about 25 bushels; hay, 1 ton; oats, 30 bushels; winter wheat, 10 bushels; potatoes, 75 bushels; Hungarian and millet, from 1 to 3 tons; when raised for seed, from 10 to 15 bushels. Improved lands can be bought at from $5 to $30 per acre; good farms are selling at $10 to $15 per acre; unimproved are worth from $1 to $10. Our poorest lands will produce the finest grapes. Small fruits generally do well; apples seldom fail entirely; peaches fail about two years in three. Not much attention paid to fruit, except apples.

Stock—Generally speaking, the descendants of those kept by the pilgrims, there has been considerable improvement in all kinds in the last few years. We have no thoroughbred horses; a few Short Horns of medium pedigree. There is more improvement in hogs than any other stock. Berkshire and Poland Chinas about the only breeds. Sheep have been improved by introducing the long-wool breeds. There are Cotswolds, Leicester and Lincolnshire, but few Merinos. The farmers are awakening to their own interests in this matter; men, that a few years ago could see no difference in the old razor backed, hazel splitter and improved breeds, are being rapidly converted, when they see a half blood calf selling higher than their yearling, begin to inquire into causes.

ST. FRANCOIS COUNTY.

The surface of this is somewhat broken and hilly. It is not exclusivly a farming county, yet notwithstanding the numerous hills, there is considerable as good farming land as can be found in the State. It is well watered by numerous never-failing springs, besides the St. Francois river and several streams and creeks.

It is a timbered county, no prairie land. There are about 280,091 acres in the county, of which about 45,000 acres are in cultivation. The productions being corn, yielding an average of 30 bushels per acre; wheat, 15 bushels; also good crops of rye, oats, potatoes, etc. Blue grass, for grazing; timothy, for hay, and clover for a fertilizer.

There are still some public lands in the county. Improved lands are worth from $10 to $50 per acre; unimproved lands, suitable for cultivation, from $1 to $5 per acre.

Improved breeds of horses, cattle, sheep and hogs have been freely introduced. The Berkshire breed of hogs, and Cotswold sheep have the preference.

There is an abundant supply of lead and iron ore in this county, both developed and undeveloped.

STODDARD COUNTY.

About two-thirds of the surface of this county is rolling, with a soil of clay loam, the remainder is level, sandy loam, all very fertile, and almost destitute of stones. Good timber covers about nine-tenths of the county, consisting of every kind of oak, hickory, ash, cypress, walnut, gum, poplar, etc. About one-tenth is in cultivation, producing on an average as follows, viz.: Corn, 40 bushels; wheat, 20 bushels; rye, 30 bushels; oats, 50 bushels; cotton, 250 lbs.; tobacco, 500 lbs.; potatoes, 250 bushels, etc.

There are no public lands remaining. Improved lands are worth from $5 to $10 per acre; unimproved from $1 to $5.

This county is exceedingly favorable for all kinds of stock raising, the winters being short and mild, and feed abundant; often large numbers of stock require no feed through the winter.

The various breeds of stock are, in the main, common, though there are a few choice herds. The greatest improvement in stock has been in hogs. This county, with its fertile soil at low prices, markets accessible, mild, healthy climate, is one of the most inviting in the State to those seeking homes.

ST. LOUIS COUNTY.

This county, although of ancient lineage, dates its organization proper only back to April, 1877. Previous to that time, in the language of the Hon. John J. O'Niel, it was "chiefly known for embracing within its limits the fifth city, in point of population, on the American continent."

Having been so long a mere appendage to a large city, it is somewhat difficult to eliminate clearly the elements of which our young county consists, or whether it has any merits at all. To ascertain this, we present a few facts.

St. Louis county is almost entirely surrounded by water, having the Missouri river running its entire length on the north side, about thirty miles; the Mississippi river the entire length of the east side, excepting the strip cut off from the river by the city, to the mouth of the Meramec, about thirty-two miles; on the south side by the Meramec river, excepting a portion where the river runs north of the line; and its western line joins with Franklin by only about eleven miles.

The St. Louis city directory places the average level of the county 372 feet above tide water at Mobile Bay, and the top of the hills in Meramec township are about 400 feet above the directory. No more healthy or beautiful building sites for residences of the St. Louis merchants can be found anywhere than on the bluffs along the banks of the noble Missouri, which rise from 100 to 200 feet above the river now jutting out to the water, again receding half a mile. Steamboats from the great city passing up and down furnish pleasure sailing, and the narrow guage railway in course of construction will furnish easy and direct communication with the city. Fishing, hunting, collecting specimens, and the splendid scenery, offer abundant enjoyment. Thus business men and their families can find all the elements of health and enjoyment at their own doors.

The county is divided into five townships.

St. Ferdinand township, better known as Florissant, which name, given by its first explorers, expresses its character as a flower garden in beauty and productiveness. It is the most fertile, wealthy and populous townships of the county. Its principal towns are St. Ferdinand, Bridgeton and Brotherton.

Central township is more elevated and rolling, resting on a limestone formation of fine building material, along with coal and fireclay. It has numerous small streams and springs, and the lands are of excellent quality. Its towns are Clayton—the new county seat, Laclede and Webster.

Carondelet township is the most southerly, with fine water resources on the Meramec and Mississippi rivers, well adapted to furnaces, foundries, factories, mills, and bleacheries, quarries, numerous numerous natural caves, commanding building sites and excellent soil. South Carondelet, Jefferson Barracks and Quarantine are its principal towns, with quite a number of small settlements.

Bonhomme township touches both the Missouri and Meramec rivers, with their rich bottoms, fine hills, numerous streams and heavy timber. The lands are somewhat broken. Its principal towns are Kirkwood, Manchester, Ballwin and Meramec.

Meramec township is the most westerly of the county. It touches the Missouri and Meramec rivers on the north and south, and joins Franklin county on the west. It has fine bottom lands. The eastmost spur of the "Ozark range," runs through the center of the county, coursing at a point on the State road, the water falling on the one edge of the road to flow into the Missouri, and on the other edge into the Meramec. This spur of the "Ozarks" expend themselves near St. Louis. These hills here abound in marble and limestone, paint clays and gravel used as an iron flux and for roads, and are worked at Glencoe quarries. The hills are rugged and broken, but the soil of good quality, fine for fruit. Chesterfield, Melrose, Allenton, Eureka, Glencoe and St. Paul, are the principal towns.

Lakes—Spanish lake, in St. Ferdinand, Creve Coeur, in Bonhomme, and Wild Horse in Meramec, besides numerous bayous and sloughs, furnish ample fishing places, and are justly celebrated as shooting grounds for wild fowl.

Trees, Shrubs and Vines—found in the county. Alder, apple, ash, bass-wood, birch, blackberry, bladder-nut, burning-bush, button-wood, buckeye, blueberry, box-elder, buckthorn, bumelia, cherry, cedar, coffee tree, coralberry, cottonwood, cupseed, dogwood, elder, elm, false-indigo, grape, green-brier, gooseberry, hackberry, hazel, haw, hickory, hop, hop-tree, hornbeam, holly, judas-tree, locust, maples, moonseed, mulberry, oaks, papaw, persimmons, plumb, prickly ash, rose, raspberry, St. Johns-wort, spice-bush, sassafras, sumach, spirea, service-berry, staffvine, thorn, trumpet, creaper, Virginia-creeper, virgin's-bower, walnut, willow. Some of this growth is of extraordinary size.

Indian relics and fine geological and botanical specimens are numerous. Many of the county roads, ravines and river bluffs, present the most picturesque scenery and invite examination by the naturalist, artist and antiquarian.

The crops—hay, corn, wheat and oats, are the great staples, but the absence of recent reliable statistics keeps us in a state of uncertainty that ought not to exist, and should be promptly removed.

Rye, buckwheat, barley, beans are but little raised as farm crops. Hungarian grass and millet, Irish and sweet potatoes hold an important position. Hemp, flax, cotton and tobacco cannot be classed as *crops*, although the first and last at one time covered considerable areas.

This year few crops come up to the average. Hay was good. Wheat looked fine, but did not thresh out up to appearances. Many fields yielded 20 to 30 bushels to the acre, but other from 5 to 10. A field 40 years in cultivation, yielded 32 by judicious clovering and sheep. Corn is short, being about two-thirds of a crop. Oats a good crop. Potatoes about a fourth crop.

The horticultural products are apple, pear, peach, cherry, apricot and plum. The last two sparingly planted. Grapes and the small fruits take quite a position. Summer apples were fair; winter varieties wormy, poor, and a small crop. Peaches a medium crop. Pear, good crop. Cherry, a fair to good crop. Apricot, very good crop. Plums, very poor. Grapes, quite a small crop, except Ives and Norton. Small fruits abundant. Mulberries, service berries, persimmons, abundant. Papaws very scarce. Hazel nuts abundant, other nuts quite scarce. Mast crop inferior, very wormy.

We give what can be accepted as fair approximation to the actual facts gathered from the best sources available. There are about 124,000 acres under cultivation, as follows:

Farm crops, 96,500; pastures, 19,700; orchards, 7,800; hay, 33,500; corn, 32,000; wheat, 14,000; oats, 8,000.

Fruit—apples, 5,000; pears, 650; peaches, 2,000; cherry, 70 vines, 175.

Poultry and bees—chickens, 11,300; turkeys, 6,500; ducks, 6,300; geese, 8,000; bees, 500.

Population and voters—the population of the county is about 40,000, but no census has been taken since the separation. The county has 10,328 children, entitled to the school fund.

The total vote for Tilden and Hayes in 1876, was 5,562. At the recent election November 1878, in the case of the poll tax amendment, for 1,658, against 4,926. These figures show well for a question so little understood, and so greatly misrepresented, and with a large element who were instructed to regard it as an attack on their rights. For Supreme Judge, was 5,841; this may be accepted as about the true vote. The whole vote is but little in excess of the number of taxpayers, as shown in a subsequent table, and shows that many citizens are direlict in this duty.

TAXES AND TAX-PAYERS.

TAXES FOR 1878—PERSONAL LIST.

Number of Tax-payers.	Township.	Valuat'n Dollars.	State Tax.	County Tax.	Road Tax.	Kirkw'd School.	Kirkw'd Town.	Total Tax.
1,159	St. Ferdinand.......	$ 732,430	$2,929 72	$1,831 03	$ 732 43			$5,494 23
1,005	Central	688,750	2,755 00	1,721 87	688 75	$96 16		5,261 78
863	Carondelet	548,660	2,194 64	1,371 65	548 66	666 16		4,781 11
1,089	Bonhomme..........	676,550	2,682 20	1,676 37	670 55	1,159 20	$1,071 74	7,260 16
668	Meramec.............	280,900	1,123 60	702 25	280 90			2,106 75
4,784	Total	$2,921,290	$11,685 16	$7,303 22	$2,921 29	$1,921 72	$1,071 74	$24,903 03

REAL ESTATE LIST.

Number of Tax-payers.	Township.	Valuat'n Dollars.	State Tax.	County Tax.	Road Tax.	Kirkw'd School.	Kirkw'd Town.	Total Tax.
1,141	St. Ferdinand	$5,632,035	$22,528 14	$14,080 08	$5,632 03			$42,240 26
1,380	Central	6,453,310	25,813 24	16,133 27	6,453 31	$1,308 48		49,708 31
1,023	Carondelet	3,564,750	14,259 00	8,911 87	3,564 75	1,410 20		28,145 82
1,204	Bonhomme........	3,134,650	12,460 28	7,836 63	3,134 65	3,468 96	$2,214 04	29,114 55
700	Meramec	1,104,490	4,417 96	2,761 23	1,104 49			8,283 68
5,448	Total	$19,889,235	$79,478 62	$49,723 08	$19,889 24	$6,187 64	$2,214 04	$157,493 62

The district school taxes amount to $47,728.17. "St. Louis county is charged with $45,954.06 revenue tax, and $45,954.06 State interest tax, making a total of $91,908.12, or $43,485.76 more than Buchanan county, which is the next largest county in the State."

This gives an average to each real estate owner of land valued at $3.650 77, and a tax bill of $28.52. The personal tax-payers own $610.63 each, and pay $5.42. The rate fixed was 40 cents per $100.

SCHOOLS AND SCHOOL TAX.

There are 71 school districts, besides Kirkwood, Webster and Florissant. The rate per $100 of tax for school purposes, varies from 5 to 90 cents. There are 14 districts rating from 5 to 15 cents; 41 from 20 to 40 cents, and 19 from 50 to 90 cents.

FARM STOCK.

The assessor's returns of 20th January, 1878, is as follows:

	Horses.	Value.	Mules.	Value.	Sheep.	Value.	Hogs.	Value.	Cattle.	Value.
Central. ...	1,640	$67,020	600	$21,835	1,054	$2,350	4,127	$15,475	1,841	$35.585
Carondelet.	1,383	54,770	336	15,830	299	402	3,162	13,129	1,483	22,790
Bonhomme	1,506	57,185	712	32,746	747	985	6,134	21,024	2,241	34,485
Meramec..	1,056	38,943	464	20,000	868	1,751	6,757	23,792	1,328	19,532
St.Ferdin'd	2,202	100,305	1,034	57,165	2,349	5,085	8,216	33,660	2,219	40,230
Total...	7,787	$318,283	3,153	$147,911	5,337	$10,573	28,396	$107,030	9,112	$152,983

Of the character of the stock we note that all kinds have improved rapidly during the last few years. Of cattle, Short Horns were introduced at an early period, and are much esteemed for their beef-making qualities. Milkers being more in demand, the Jerseys are in great favor, and large numbers of the finest domestic and imported animals are owned in this county, and take the lead as family and fashionable animals. Ayrshires, Herefords and Devons are owned in considerable numbers. There are also a few Brahma cattle. There are several extensive and justly celebrated breeders of fine stock, particularly in the northeast portion of the county. Of horses, some of the best animals are owned here, and, as might be expected from contiguity to a great city, the "trotter" is the fancy animal. Some very fine Norman or Percheron and Clydesdale horses have been imported and bred in the county, and are gaining in the esteem of many where power is wanted rather than speed. The infusion of this blood gives an increase of power and steady speed, well adapted to both furrow and heavy wagon. A *fast walking* horse makes quite a difference in a day's work in the plow or wagon.

Sheep—Besides the common sheep, the Cotswold, Southdown and the improved "Kentucky" sheep all enter into the herds, some of the animals being of first quality. Sheep are remarkably free from diseases; their great enemy is the dog; some of the most valuable animals have fallen victims, and it is hard to find juries that will award full damages.

Hogs—The public mind is so far enlightened on the subject of breed, that the "old-fashioned animal" is fast disappearing. Farmers who still have them try to keep them far in the back-ground. All the improved breeds are represented, but the general favorite is the Berkshire, combining health, economy, easy fattening and early maturity. For the family, and where corn has value, it is esteemed. For heavy hogs, the Poland China and Chester White have many admirers.

The possession of valuable stock greatly promotes the adoption of laws for the restraining of animals. Pure stock can not be maintained pure while running at large, nor can they be kept in good condition while running over large areas of thin land.

Fences and stock law—St. Louis county has about 3,680 miles of fence. The several kinds of fence, common and ornamental, costs largely over $1,175,000, and requires renewal every ten to twelve years. It cost about $9.50 for every acre fenced. It cost about $21.90 per head of all the live stock in the county to put up fences, or $2.19 per annum. For every dollar invested in stock, it required $1.38 to be invested in fence, and this renewable in about ten years. By the adoption of the "law restraining domestic animals from running at large," about two-thirds of the cost of fencing was saved, and fencing can be reduced to a minimum to advantage. Instead of unsightly harbors of weeds in the "fence corners," the farm crops come close up to the road-line, and the road used for a turn-row. In the thickly settled parts of the county, front fences are rapidly disappearing, and lawns, with their valuable ornamental shrubs and flowers, give appearance of a nicely kept *park,* instead of "pigeon boxes," and "gingerbread" fences that cut off all intrusion, causing "primness" to be the only governing idea. The growth of forest trees is promoted, and it is truly astonishing how many botanical plants of interest and value are being found since "browsing" is prevented. The law stops a great leakage in farm economy, and materially aids in placing the annual balances on the farmer's side. Farmers need never "cry to Pan" to help them in their struggle to remove the burdens that crush them till they get out from under the weight of fence.

The law operating in this county has several material defects, but with all its faults it is invaluable. The *neutral mile*, and the anomalous existence of the general "fence" and "stray" laws, along with the *county stock law*, causes great inconvenience, and must be remedied. (See laws of 1877.)

Roads and Road Law—There are 850 miles of earth road, 152 miles of McAdam and gravel road, and 75 miles of railroad. The roads and bridges cost, exclusive of railroads, about $21,000 annually for repairs, beside the labor performed under the road law.

The advantages of good roads can hardly be over-estimated, and the old county gave great attention to them at a very early day. Without good roads, churches, schools, granges, halls, markets, are lost investments, and the buildings, stock and crops of the farm have but little value outside of the occupiers, and they must live like *hermits* much of their time. The general law is so far, doing much better for the roads themselves and for the pockets of the tax-payers, than the former special law, and as its workings become more familiar, it will be more effectively carried out. As it is, in many neighborhoods, the people are uniting to gravel the worst stretches of road, when put in condition to receive the gravel at the cost of the county at large. This is doing much to secure good roads, and enhances the value of everything, and, consequently, of the real estate as well.

Railroads—The county is intersected by three principal through lines, and the "narrow-gauge" in course of construction and partly in operation.

The Iron Mountain road runs along the entire east side of Carondelet township. The Kansas City & Northern runs through part of Central and all of St. Ferdinand townships, crossing the Missouri river at Brotherton, opposite St. Charles. The Missouri Pacific runs through a portion of Central and Carondelet townships, and the entire south side of Bonhomme and Meramec townships.

The Narrow-Gauge is open for traffic from St. Louis to St. Ferdinand, with a branch graded to Academy Avenue, west of Clayton, the county-seat. It is being extended north to Creve Coeur lake, and west to Manchester and the gravel pits and quarries in the center of Meramec township. It is organized and built with the idea of being in the power of every farmer to own stock and control the working of the road.

WILLIAM MUIR.

FOX CREEK, St. Louis Co., Mo.

STONE COUNTY.

The soil of this county is a rich red loam, except the river bottoms, which are alluvial. In the extreme northern part of the county the soil of the immediate surface is light and ashy, but at the depth of a few inches the loam is found. As you go south, the soil on the surface is a dark vegetable mold, directly underneath which is the red loam; and this loam (as is shown where wells have been dug) continues to a depth of forty or fifty feet. The alluvium on the river bottoms is from a few inches to twenty feet in depth, and in productiveness is unsurpassed.

The unimproved lands of the entire county, except a narrow belt across the northern end, are covered with quite a heavy growth of timber: this narrow northern belt being more or less densely covered with scrub-oak, black-jack, and a species of dwarf hickory. Going south, the timber becomes heavier, the chief varieties being oak, hickory, black and white walnut, elm, maple, linden, sycamore, locust, and many other kinds of lesser growth. The prevailing timber is oak, of which there are seven or eight varieties; the most abundant of which are the black and white oak, both of which are valuable for lumber,—as are also the post oak, chincapin and burr oak, the last of which is found chiefly in the bottoms, where it often attains the size of four to five feet in diameter. The hackberry, though not abundant, is very valuable for lumber, and is, I think, superior to oak, where finishing in grain is desired. Red cedar is also quite abundant; and in the southern part of the county there is a large amount of yellow pine, the value of which is too well known to need comment.

It will be seen from the above remarks that there are no prairie lands in the county; though in the extreme northern part, there are level or gently undulating stretches of land, that seem as if they might have been prairies at some former period.

The proportion of cultivated land in this county to the uncultivated, is probably not more than one acre in twenty.

After leaving the northern line of the county a few miles, going south, the surface of the country becomes gradually more and more hilly, until, as you approach the southern boundary, the hills become little less than mountains. And throughout the county there is comparatively but little land in cultivation, except what lies in the river bottoms and on the lesser streams. And yet these uplands, rough and stony though they are, have a rich, deep soil, and if devoted to the raising of fruit, especially grapes, would soon be among the most valuable lands in the country. These hills are now covered with wild grape vines, the fruit of many of which has as fine a flavor as the most celebrated grapes in the gardens of the North and East. These lands can now be had at from one dollar to two dollars per acre. And when the advantages of this county are better and more widely known, intelligence and industry from abroad will come in here and cover these hills with pleasant homes and orchards and vineyards, where now are only the barrenness and desolation of untamed Nature.

The products of the county, as now farmed, are corn, wheat, rye, oats, and a very little hay. Corn averages from thirty to forty bushels per acre; wheat, about fifteen bushels, rye, the same, and oats about thirty. But with improved methods of cultivation, the soil here would yield double this average in each of the crops.

Cattle, horses, mules and hogs are raised in considerable numbers; and owing to the mildness of the winters, stock of all kinds can be easily and profitably raised. But little wool is grown, owing to the difficulty of protecting the sheep from dogs. The quality of stock raised in the county is inferior. Neither thoroughbred cattle or horses have been introduced to any extent, but improved breeds of hogs have been quite extensively introduced, but they have not flourished as well as the native stock; but whether from lack of proper treatment is not yet known. Most of the improved breeds have died the present year, while the loss in native stock has been slight.

There is a large amount of public lands in the county—many thousand acres, but just how many I cannot now take time to ascertain.

Improved farming lands can be had at from $10 to $20 per acre, according to location. The price of unimproved lands I have stated above. But there are thousands of acres here that can be had under the homestead law, which brings the land down to about eighteen cents per acre.

I believe it can be truthfully said, that this locality is as healthy as any that can be found in the State. The water is remarkably pure, and copious living springs abound all over the county. And in its adaptation to successful fruit-growing and stock-raising, I think it is unsurpassed by any locality in the country.

SULLIVAN COUNTY.

Sullivan county is situated in the second tier of counties from the Iowa line, on the divide between the Chariton on the east, and Grand River on the west, and contains 648 square miles.

Face of the Country—About sixty-five per cent. prairie, bottom land 10 per cent., land rolling, and nearly all susceptible of cultivation. The streams run from north to south, and are from two to four miles apart. In the eastern part of the county the streams are all small and, being fed mostly with surface water, cease running in a dry season. Through the central and western portions of the county, the streams are larger, some of which are strong enough to run water mills a good part of the year.

Soil varies from one to four feet in depth on the highland, and from three to six feet in the bottom, and consists of a rich, black loam, with a clayey subsoil.

Timber, of which there is a fine broad belt extending across the county from north to south, through the center, and various smaller strips along the creeks on each side, is of good quality, and convenient to get at. We have many varieties, of which white, black and red oak, walnut, hickory, and red and white elm are most abundant. There are plenty of saw-mills in the county, at which hard wood lumber can be bought at from $1.25 to $1.50 per 100 feet.

Lands—There are no public lands in the county. About 35 per cent. of the land belongs to non-residents, but their land is being rapidly bought up by those who wish to make themselves homes.

About one-third of the land is in cultivation—on the prairie, a much greater proportion than that. Improved lands are selling at from $12.50 to $25 per acre; unimproved, mostly from $5 to $10.

Coal—There are several good coal banks in the county, and numerous indications of coal in other places.

Stone—We have many excellent limestone quarries, where a No. 1 quality of stone is taken out for building purposes. Also, several good sandstone quarries.

Corn does well; average yield per acre, 35 bushels; price 25 cents. The principal demand is for feeding cattle and hogs, very little being exported from the county.

Winter wheat does very well on the timber lands; average yield, 15 bushels. On the prairie there is very little sown, as there is usually not enough snow on the ground to protect it from freezing out during the winter.

Spring wheat has done very well on the prairies for the last two or three years. Previous to that, for a number of years, the chinch-bug usually ruined it.

Rye—Not much sown; average, 15 bushels per acre.

Oats—Average, 30 bushels per acre.

Timothy hay is one of the main crops of the county; average yield, 1½ tons per acre.

Timothy Seed—Average, 3 bushels per acre; about 10,000 bushels exported annually.

Sorghum—The most of the farmers raise a sufficient quantity for their own use.

Hemp and flax are but little raised.

Tobacco is grown considerably for home consumption, but not much for export.

Irish Potatoes—Average yield, 75 bushels per acre.

Sweet Potatoes—But little grown.

Fruit—With care, nearly all the varieties of fruit that are grown in this latitude can be grown here with success; but many of the early settlers appeared to think all that was necessary was to plant the tree, after which it was left to take care of itself, and the result was discouraging. During the last ten years, much more care has been taken and the result proves highly gratifying.

Cattle—This is a good county for cattle raising and fattening. During the last few years the stock has been much improved by the introduction of thoroughbred and grade Durhams.

Sheep do well, if not kept in too large herds. Cotswold and Southdown varieties are taking the lead.

Hogs have been somewhat below par for the last two or three years, owing to the cholera, which has been very fatal in some localities. The Berkshires are the general favorites, and the main share of the hogs in the county are either full bloods or high grades of that variety. Quite a respectable number of breeders though, prefer the Poland-China.

Railroads—A branch of the Burlington and Southwestern passes centrally through the county from north to south. The Quincy, Missouri and Pacific, which will pass centrally through the county from east to west, is now in process of construction, with prospect of early completion.

Newspapers—The Milan Republican and Sullivan Standard.

Granges—Seventeen.

Agricultural Societies—One; held their first annual fair this fall; made a very creditable showing.

Farmers' Clubs—One.

TEXAS COUNTY.

This county contains about 700,000 acres of land. The Ozark Mountains extend through the county and the surface is consequantly considerably broken. There are some prairie lands and some bottom lands on the streams, all of which are very fertile.

The county is well watered by several large streams.

Timber consists of pine, hickory, oak, the undergrowth is principaly hazel, sumach, and small hackberry.

About one-tenth of the land is in cultivation. The average yield per acre is of corn, 25 bushels; wheat, 10 bushels; oats, 35 bushels; rye, 15 bushels.

There is a large amount of public land left in the county.

Value if improved lands from $3.00 to $5.00 per acre. Unimproved from 50 cents to $2.00 per acre.

The various breeds of stock are raised, and there has been but little improvement made except in hogs, a few Cotswold and Southdown sheep, and a few Short Horn cattle.

This county is naturaly well adapted to fruit growing, and meadow grasses.

In point of health is second to none.

VERNON COUNTY.

Vernon county forms a portion of what is known as Southwest Missouri. It lies in the 38° parallel of latitude, being about the same as that of Richmond, Va., and Louisville, Ky., and between the 17° and 18° of longitude, west from Washington. It contains 838 square miles, and is bounded on the north by Bates, on the east by Cedar and St. Clair, on the south by Barton and on the west by Bourbon and Lynn counties, Kansas.

Physical Character—The whole surface of the county is rolling and undulating, with occasional irregular mounds rising above the level of the country.

It has about one-fifth timber to four-fifths prairie. The water courses are remarkably well distributed over the county, the bottoms of the large streams are generally wide. The prairies are small, so that it is almost impossible for one to get over 3 or 4 miles from timber.

Climate—The climate is genial as her latitude indicates. The winters are mild, as compared with those of northern Indiana, Illinois and Iowa. The themometer seldom gets down to ten degrees below zero. The cold snaps do not last more than three or four days ; it is no uncommon thing for people to throw open their doors and let their fires go down during every winter month.

Other Minerals—Iron ore is found in various localities, but to what extent it exists is at present unknown. Gypsum exists in considerable quantities, and will be valuable to mix with such soils as are deficient in lime. Some traces of lead and carbonate of lead have been discovered. There is plenty of fire clay and stone for lime and hydraulic lime.

Stone—Sand stone affords the best building material. Good quarries are now opened in various parts of the county; excellent grit for grindstones and coarse whetstones is found in abundance on Clear creek, and has already been made quite an article of export.

Mineral Springs—Three miles north of Nevada, there is a fine chalybeate spring, the water flows at the rate of two gallons per minute. In the hottest days it is as cool as if ice were in it, and is very pleasent to the taste. It is much visited by parties from Nevada. In various localities there are fine sulphur springs.

Soils and Products—In Vernon county can be found almost every variety of soil, from the poor sandy to the rich black loam, and limestone. The stream bottoms, which are wide, are rich and very productive, the soil on the mounds and along their slopes may be considered the richest uplands. Persons fancying any particular grade of soil, can be suited. The light sandy soil produces extraordinarily well, when the seasons are suitable, but in dry years cannot be depended upon.

Stock raising is decidedly a profitable business, and one from which many of our citizens derive their greatest income. Ours is decidedly a grazing county; thousands and thousands of acres unfenced, and will be for years. This almost unlimited range produces abundance of wild grass and furnishes free pasturage for all.

Cattle, as a matter of course, can be raised with very little expense. The winters are not sufficiently rigorous to demand shelter for them, and with a fair amount of prairie hay, they get along very well.

Horses and mules are raised almost as easily and cheaply as cattle, but this branch does not receive the same attention as cattle raising. Kinds of stock of horses; we have Kentucky race stock, Clydesdale, Percheron, Norman, and good stables for each.

Jacks and jennets of Maltese stock, good.

Cattle—Our natives, are good, but we have scattered throughout the county, many herds of Short Horns, selected from celebrated breeders of Kentucky, Ohio, Illinois, and from the best herds from northeast Missouri; some few Devons and two herds of Alderney.

Sheep—Cotswold, Southdown, Leicester and Merino; good flocks of each.

Hogs—Berkshire, Poland China, Chester Whites and Essex; a spirit of improvement is going on in the selection of the very best stôck of all kinds.

Our improved lands are worth from $10 to $50 per acre; unimproved lands from $3 to $10 per acre.

Corn—This section of the country is not as well adapted to corn raising as the prairies of Illinois, or the rich alluvial bottoms of our larger rivers, but our lands, with proper cultivation, yields from fifty to sixty bushels per acre. It can be made a paying crop. A large amount of corn is raised in the county every year, some farmers raising as high as 100,000 bushels.

Wheat—This county is well adapted to wheat; in fact, the culture of small grain meets with much better success than corn.

Fruits—By common consent, this portion of the State of Missouri is acknowledged to be one of the finest fruit-growing countries in the world. Apples do extremely well. They grow large and generally free from specks, and have a peculiarly fine flavor. Peaches are raised with little trouble, but are sometimes entirely killed by putting out too early in the spring. In a good peach year, they are so abundant as to be almost a drug. Pears have received but little attention as yet, but promise to do well. Of the smaller fruits, all do well, save, perhaps, currants, which seem almost a failure. Grapes are peculiarly suited to this section. They grow very prolific, and are receiving considerable attention; they scarcely ever fail.

About one-fourth of land in cultivation; no public lands in county. Crops cultivated: Corn yielding an average of 40 bushels to acre; wheat, 12½ bu.; rye, 15 bu.; oats, 40 bu.; barley, 40 bu.; castor beans, 15 bu.; white beans, 25 bu.; flax seed, 15 bu.; hay, timothy, red top, clover, two tons each to acre, or about same mixed.

Health—The county is noted for its general healthfulness. There are no local causes for disease.

Streams—The county is drained by the Osage river, which forms a part of the boundary line between this and Bates county on the north, the Little Osage, Marmaton, Big Drywood, Little Drywood, east and west forks of Clear creek and their tributaries.

Timber—Many who are under the impression that this is a vast prairie country, will be surprised at the vast amount of timber we have, which is ample for home purposes. The varieties are those usual in the State, viz: Burr, white, red, black, post and water oak, elm, sycamore, white and yellow cottonwood, black walnut, white, black and shellbark hickory, pecan, pignut, birch, maple, wild cherry, hackberry, linn, mulberry, boxelder, coffee bean, and many smaller varieties. The timber on the principal water courses and on some uplands, is well grown and of excellent quality. As a rule, however, the upland timber is scrubby, and does not amount to much for anything save firewood.

Coal—Immense beds of coal underlie the whole county. There is scarcely a section of land on which coal may not be found in greater or lesser quantities. Prof. G. C. Broadhead, State Geologist, in his geological survey of the State for the years 1873 and 1874, estimates there are 2,650,816,250 tons of coal in the county. This enormous coal field promises a sure source of wealth, when competing lines of railroads shall bring cheap transportation within reach.

WASHINGTON COUNTY.

The first exploration of Washington county was due to rumors of silver mines that were supposed to exist somewhere west of the Mississippi. Almost all of North America at that day was *terra incognita*, and dreams of a second Mexico, with its cities and palaces and unique civilization, still haunted the minds of the earlier adventurers. But as the imagination cooled, gold and silver became the object of search, and we find about the year ——, Crozat Sieur de Sochon, attracted by reports of silver on the Meramec, began to prospect along that river. No silver was found, but some of the richest lead mines of the world were discovered, which were afterward developed by Renault and La Motte. But it was not until Francis Breton discovered the lead mines near Potosi that a permanent settlement was effected, which was about the year 1765.

Washington county lies in the fairest portion of the region of which we have been speaking, and contains 475,399 acres of land, well watered and timbered, and has a population of 11,719 inhabitants.

The soil of Washington county is of various qualities, and its character is best indicated by its spontaneous growth of timber. In the bottoms we find black and white walnut, shell-bark hickory, mulberry and buckeye, and a corresponding rich heavy black soil, capable of producing large crops of excellent quality. On the ridges we find post-oak, pine, black-jack, white oak. The oak lands, with proper care, will produce fair crops. But the pine lands will produce but little excepting fruit, and are chiefly valuable for orchards, vineyards, etc. This county produces a first-class quality of yellow pine, which furnishes employment for numerous saw-mills, with their attending industries, furnishing work for men and teams, aggregating many thousands of dollars a year to its inhabitants. The red clay of the mining region will produce heavily if properly cultivated, but it must be thoroughly broken, and requires close attention.

Washington county is one of the best timbered counties in the State, not containing any prairie land, and producing all of the finest varieties of timber indigenous to this latitude. Consequently a great deal of the land was entered at an early day.

About one-fifth of the land is now under cultivation, producing all of the cereals and vegetables of this climate, in great abundance and perfection; the bottom lands comparing favorably with any in the State, while the second bottoms and uplands, with proper cultivation and a judicious use of fertilizers, can be made to produce nearly as well, and are not subject to overflow, consequently are as valuable as the lower land for farming purposes, and are considered more healthy.

The value of the improved lands of Washington county may be placed at from $12.50 to $50.00 per acre, much depending on locality, improvement and surroundings. Value of unimproved land not known, as mineral land may be placed at about $6 per acre. Mineral land (lead mines), at from $10 to $75.

The stock raised consists of horses, cattle, sheep and hogs. Some small herds of Short-Horn cattle, some few Berkshire hogs and Cotswold sheep have been introduced.

This county is one of the best watered counties in the State. Abounding in living springs, large creeks and small rivers; among the latter are the Meramec, Big river, Colois, Mineral Fork and Fourchereanault. The smaller creeks and springs are too numerous to mention. Many of the springs supplying a sufficient head of water to run a mill. Every farm has a spring, furnishing plenty of water for stock.

Washington county is one of the largest mining counties in Southeast Missouri. Zinc, lead and iron ores are found in abundance; copper, copper-cobalt and tin in limited quantities. The lead mines are the most extensive. In this connection it may be asked how it happens that a county possessing the resources of this county, and capable of supporting more than double its present population, should not be further advanced in material prosperity? Why is it that agricultural interests are so much neglected? The obvious reason is that Washington is a mining county, and where mining and agricultural interests are brought together, both suffer. Large tracts of land are owned by mining companies, who value them principally as mining lands; these tracts contain some of the most valuable farming lands in the county. Miners are permitted to settle upon these lands, with permission to clear a patch of two or three acres, provided they mine upon the tract upon which they live, or one belonging to its owners. Of course there is no inducement upon the part of the miner to improve, and if he were disposed to do so the company would discourage it, if not absolutely prohibit it, for it would take him from the mines, out of which the companies make their money. And, again, if a man owns land of his own, he is apt to neglect them in the winter and autumn, for the mines, as they furnish the readiest source of procuring a little money. Mining is demoralizing, because of the element of chance that enters into the pursuit; a miner continually dreams an immense prospect that will make him a fortune in a short time, and as it is among the possibilities, many farmers, that might do well on their farms, leave them for the chances of the mines, and generally the fall and winter are frittered away without anything being gained.

Not until the shallow mineral of Washington county is exhausted, and companies are compelled to employ labor at fixed wages, will it make great material progress.

Reports from County Agricultural and Mechanical Societies.

NODAWAY COUNTY.

OFFICERS—1878.

President—Simeon Wright.
Vice-President—S. T. Kennedy.
Treasurer—Thos. H. Brown.
Secretary—A. P. Morehouse.

DIRECTORS.

Isacc N. Wray,	Simeon Wright,
E. M. Gardener,	Adelmy Stingley,
Thomas H. Brown,	Frank Bellows.
A. P. Morehouse,	Jno. M. Lamar.
Samuel T. Kennedy,	L. C. Miller,
Henry Linville.	

Enclosed grounds, 23 acres.

Floral Hall 40x80 feet front, with L 30x40 feet, two stories high.

140 stalls for stock.

Amphitheatre seats 2.500 people.

Grounds and improvements cost	$8,000
Stock	$4,000
Present indebtedness	$1,000

FINANCIAL EXHIBIT.

Following are the receipts and expenditures of the Nodaway County Agricultural and Mechanical society, for the year 1878:

RECEIPTS.

Gate fees	$2,407 10
Booths	1,092 20
Entry fees	618 25
Stall rent	69 90
Amphitheater receipts	34 75
	$4,222 20

EXPENDITURES.

Total premiums	$2,434 70	
Police and gatekeepers	149 75	
Wood and labor	215 60	
Lumber	534 90	
Hardware, etc	64 52	
Printing and advertising	102 58	
Balloon ascension	201 55	
Music—Graham band	98 00	
Miscellaneous	68 18	$3,869 78
Balance to apply on indebtedness		$352 42

We certify that the above statement is correct,

A. P. MOREHOUSE, Sec'y,

THOS. H. BROWN, Treas.

UNION AGRICULTURAL AND MECHANICAL ASSOCIATION 1878—LEWIS, KNOX AND SHELBY COUNTIES.

OFFICERS.

President—L. C. Bradshaw.
Secretary—T. J. Randolph.
(Names of other officers not given.)

FINANCIAL EXHIBIT.

Cash on hand, last settlement	$54 23
Total receipts for 1878	1,819 85
	$1,874 08

CONTRA.

Amount expended in premiums	$1,215 80
Amount expenses paid	428 70
Amount cash on hand	229 58
	$1,874 08

The grounds embracing thirty acres, are located one mile from Newark, Knox county, and are enclosed under a good plank fence. Commodious amphitheater, art and floral halls. A fine variety of stock exhibited, and in splendid condition. Also a fine display of farm products and implements. The display of domestic fabrics, vegetables, cakes and confections was splendid.

T. J. RANDOLPH,
Secretary.

SALINE COUNTY CENTRAL ASSOCIATION—1878.

OFFICERS.

President—V. Marmaduke.
Vice President—Thomas W. Russell.
Treasurer—J. H. Cordell.
Secretary—J. Vandyke.
Chief Marshal—W. S. Jackson.

DIRECTORS.

V. Marmaduke.
T. C. Rainey
Jno. Hoggin,
J. R. Letcher,
R. B. Thorp,
J. H. Eakins,
Thomas W. Russll,
Jno. W. Sparks,
L. H. Tucker,
J. R. Berryman,
B. Sappington,
H. H. Harris,
F. A. Blackburne.

FINANCIAL EXHIBIT.

Amount paid for premiums	$4,000
Amount for improvements	830
Total receipts	$4.715

J. VANDYKE,
Secretary.

CHARITON COUNTY.

KEYTESVILLE, Mo.

Society consisted originally of fifty members, but has failed as an associated enterprise, and is now owned by W. E. Hill, Esq., and was conducted the past two years as an individual effort by the owner.

The display of agricultural and mechanical implements was light, but that of grains and farms products generally, of fruits, garden, etc., was very fine indeed, superior to anything of the kind ever had before at this point.

The receipts were $1,895.

CONTRA.

Premiums paid	$1,495 70
Amount expended on grounds	740 21
	$2,235 91

NEWTON COUNTY.

NEOSHO, Mo., January 7th, 1879.

OFFICERS

Of the Newton County Agricultural and Mechanical Society:

President—J. M. Z. Withrow.
Vice-President—Jacob Stewart.
Secretary—John M. Sherwood.
Treasurer—J. C. Heems.

DIRECTORS:

Joshua Roberts,
R. J. Henderson,
H. J. Curtue,
J. C. Heems,
Jacob Stewart,
James Robinson,
A. M. Sevier,
George W. Carson,
Harry Tamblyn,
J. M. Z. Withrow,
James Alexander,
John M. Sherwood,
F. M. Ratliff.

Number of stockholders	212
Number of shares of stock, at $10 per share	273

The society has a lease of 15 acres of ground, one mile north of Neosho, Hickory creek flowing through the grounds. The enclosure contains an amphitheatre, floral hall and suitable stalls for stock, and is well shaded by beautiful forest trees.

The following is an exhibit of entries of stock, etc., for 1878:

CLASS A.

Flowers, cakes, preserves, canned fruits, jellies—Total entries, 119.

CLASS B.

Farm products, 16; vegetables, 16; fruits, 36: total, 68.

CLASS D.

Bees and honey, cloth quilts, ornamental needle work, fine arts, wax and ornamental work.—Total entries, 190.

CLASS E.

Farm machinery, 21; display of manufactured goods, 8; sheep, 7; swine, 21; short horn cattle, 12; graded cattle, 15; poultry, 6; mules, 6; horses for all work, 32; roadsters, 4; draft, 5; saddle, walking and pony, etc., 15.

Total entries in all departments, 534.

FINANCIAL STATEMENT.

Cash on hand September 1st, 1878	$ 150 00
Gate fees	514 00
Rent of booths, etc	95 60
Entrance fees	157 40
Other sources	8 00
Cash loaned by directors	300 00
	$1,225 00

AMOUNT EXPENDED.

Permanent improvements	$325 00	
Premiums	495 75	
Fair expenses	229 25	
Music	100 00	
Secretary's salary	75 00	
		$1,225 00

JOHN M. SHERWOOD, Secretary.

APPLETON CITY, Mo., January 11, 1879.

J. P. MCAFEE, Missouri State University, Boone county, Mo.

DEAR SIR—The St. Clair, Bates and Henry District Fair Association held a fair at Appleton City, Mo., on September 25, 26, 27 and 28, 1878.

There were 46 entries of mules, all ages.
" 12 " jacks.
" 7 " jennetts.
" 26 " driving horses, single and double.
" 38 " brood mares and fillies.
" 57 " stallions and young horses.
" 23 " all the saddle rings.
" 8 " draft team rings.
" 20 " boy riding.
" 8 " lady riding.
" 41 " in speed rings.
" 35 " blooded cows and heifers.
" 28 " blooded bulls.
" 47 " of all others.
" 41 " Berkshire hogs.
" 31 " Poland China hogs.
" 49 " long-wool sheep.
" 28 " short-wool sheep.

There was a fine display of fruits, flowers, poultry, agricultural products, etc.

The society owns 30 acres of land, and they have expended in improvements, during the last three years, $4,700, and have paid the last year in premiums $1,795.

The gate fees were about $1,500, and the entrance fees on speed rings and sweepstakes, $256; selling of booths, $200. The society owes about $700. The stock is mostly owned by the farmers of the counties of Bates, St. Clair and Henry. The association expects to pay off all indebtedness in another year.

Yours, etc.,
AVA E. PAGE, Sec'y.

BOONE COUNTY AGRICULTURAL AND MECHANICAL ASSOCIATION.

OFFICERS—1878.

Joseph Estes—President.
E. C. More—Vice President.
W. W. Garth—Secretary.
James C. Orr—Treasurer.

DIRECTORS.

Monroe Bateman,
Berry A. Watson,
Thaddeus Hickman,
Malcolm G. Quinn,
Robert P. Glenn,
William L. Victor,
Joseph I. Sterne,
Fielding W. Smith,
Moss P. Parker.

Amount authorized capital	$5,000 00
Par value shares of stock	25 00
Cash value real estate and improvements	5,000 00

Number shares stock issued 150.

Number shareholders 120.

Date organization, 1858.

Time holding fair, commenced September 10th, 1878, and continued five days.

FINANCIAL EXHIBIT.

RECEIPTS.

Rents	$ 666.15
Gate fees	1,282.15
Entrance fees	553.60

No entrance fee charged in regular rings or in Agricultural, Floral or Mechanical Departments.

Total	$2,401.90

EXPENDITURES.

Premiums and improvements	$2,314.65
Balance	$187.25

DEPARTMENTS.

Number articles exhibited in Mechanical, Floral and Agricultural Departments	493
Number of animals exhibited	350
Amount premiums offered	$2,000.00
Amount premiums paid	2,000.00

A correct statement:

W. W. GARTH,
Secretary.

PROCEEDINGS

OF THE

Missouri State Horticultural Society,

AT ITS

TWENTY-FIRST ANNUAL SESSION,

HELD AT

JEFFERSON CITY, MO., JANUARY 28-30, 1879.

OFFICERS FOR 1879.

PRESIDENT,

HON. N. J. COLMAN, St. Louis.

VICE-PRESIDENTS:

First Congressional District—Henry Michel, St. Louis.
Second Congressional District—H. T. Mudd, Kirkwood.
Third Congressional District—Jacob Rhodes, Bridgeton.
Fourth Congressional District—H. D. Wilson, Cape Girardeau.
Fifth Congressional District—W. S. Jewett, Crystal City.
Sixth Congressional District—M. S. Roundtree, Springfield.
Seventh Congressional District—Geo. Husmann, Sedalia.
Eighth Congressional District—Z. S. Ragan, Independence.
Ninth Congressional District—J. Madinger, St. Joseph.
Tenth Congressional District—W. H. Miller, Chillicothe.
Eleventh Congressional District—S. M. Tracy, Columbia.
Twelfth Congressional District—J. Hawkins, Hannibal.
Thirteenth Congressional District—W. Stark, Louisiana.

SECRETARY,

S. M. TRACY, Columbia.

TREASURER,

G. C. SWALLOW, Columbia.

Proceedings.

The twenty-first annual meeting of the Missouri State Horticultural Society, was held in the United States court room in Jefferson City, in accordance with the following call:

MISSOURI STATE HORTICULTURAL MEETING—TWENTY-FIRST ANNUAL SESSION.

The twenty-first annual meeting of the Missouri State Horticultural Society will be held in Jefferson City, on the 28th day of January inst.

The friends of horticulture and kindred pursuits, in Missouri and throughout the Mississippi valley, are cordially invited to be present and to participate in the deliberations of the meeting.

Samples of fruits and native wines, and horticultural products of every description, are respectfully solicited.

Essays on horticultural topics are desired, and will be thankfully received. Discussions will be had on the following topics:

1. Apple Orchards.—Best varieties for market and family use; best plan for laying out orchards; distance apart of planting; pruning; cultivating; diseases of trees and fruit.
2. Peach Culture.—Best varieties; distance apart to plant the trees; cultivation; pruning; diseases; present condition of buds.
3. Pear Culture.—Proper mode of planting and cultivating; disease of the tree.
4. Cherry, Plum and Quince Culture.—Best varieties and methods.
5. Small Fruits.—Strawberries, raspberries, currants and gooseberries; new varieties.
6. Grape Culture.—Cause of failure; rot, mildew and phylloxera; what varieties can be recommended; have we good grapes for wine; wine-making.
7. Vegetable culture and farmers' gardens.
8. Home Adornment.—Best trees, shrubs and vines for; how to lay out and plant a lawn; culture of flowers.

9. Forestry.—Should the State or general government take any action to preserve existing forests, or to encourage the growth of trees on our prairies? Which are the best trees to plant for wind-breaks, which for timber, and how should they be cultivated? Should nut trees be planted? What kinds and how cultivated?

10. Industrial education as an aid to horticulture.

11. Other cognate subjects may be brought before the society for discussion, on motion, at any time.

Reports from the vice-presidents of the society—there being one from each congressional district in the State—in regard to the condition of fruit culture, and to the fruits best adapted to their respective localities, will be in order at the opening of each session.

The following essays, among others, have been promised, and will be read when the subjects to which they relate are taken up for discussion:

1. "Horticulture—a potential factor in our educational, industrial and reformatory problems," by Wm. Muir, of St. Louis county.

2. "Marketing of orchard products and small fruits," by W. F. Hollister, of Louisiana.

3. "The Coming Fruit Grower," by Samuel Miller, Bluffton.

4. "The cultivation of apples," by J. C. Evans, Harlem, Clay county.

5. "Pear Culture—anatomy and hygiene of the tree; stock best adapted to its propagation; errors in culture; cause of blight," by Prof. W. Foster, Louisiana.

6. "Potatoes—their Cultivation and Varieties," by Prof. S. M. Tracy, Agricultural College, Columbia.

7. "Farmers' Front Yards," by Chas. Teubner, Lexington.

8. "The Language of Flowers," by J. M. Jordan, St. Louis.

9. "Apples—what varieties to plant; how to care for the trees to make the apple orchard profitable," by Wm. Stark, Louisiana.

10. "Entomological Notes for Missouri," by Prof. C. V. Riley, M. A., Ph. D. of the U. S. Entomological Commission, Washington City.

11. An essay by Geo. Husmann, author of "Grape Culture," has also been promised on some horticultural topic.

The society having been organized in the City of Jefferson in January, 1859, and holding its present meeting in the city of its nativity, it is proposed to have a public celebration of its twenty-first birthday in the hall of the House of Representatives, on Wednesday night at 7 o'clock, if it can be obtained, as it doubtless can be.

NORMAN J. COLMAN, President.

D. L. HALL, Secretary.

FIRST DAY.

The Society was called to order at 2 o'clock P. M., on Tuesday, January 28, 1879, by the President, Hon. N. J. Colman.

The Secretary, D. L. Hall, being absent,

C. M. Murtfeldt was appointed Secretary *pro tem.*

Messrs. Murtfeldt, Evans and Husman were appointed a Committee on Order of Business.

Judge H. G. Wilson, Vice-President, from the fourth congressional district, presented the following

REPORT:

To the President and Members of the Missouri State Horticultural Society :

GENTLEMEN—Having been informed a few days ago, for the first time, of my election as vice-president of your society for the fourth congressional district, and that it is my duty to report as to the condition of fruit and fruit culture in this district, with such other matters as may be deemed of interest, I herewith respectfully submit the following:

Fruit culture in this section has, until very recently, been very much neglected. There seems to be an impression among many farmers that good fruit, particularly peaches, cannot be grown here; but I believe this is from a want of proper knowledge of the business, and in many cases from careless culture. Among the older orchards, apples and peaches are the principal fruits, though a few of them have pear and cherry trees of great age.

APPLES.

Of the apples found in old orchards, many are supposed to be seedlings, and many are known by names not found in the books on pomology. In fact, many farmers, not especially fruit men, have come into possession of farms with a few apple trees that, considering the neglect, bear good fruit; but the names of the varieties are unknown to the present owners.

I have noticed, however, that most of the fruit that does well here is of southern origin. I can well remember an orchard in this county that must have been planted over sixty years ago by my grandfather, who was from South Carolina, and from which I have eaten fruit as far back as thirty-five years ago, when a small boy. I can remember a few of the names only of the fruit then in the orchard. One was the Horse apple, always very fine; and we had some earlier —perhaps Red June and Red Astrachan. Of the winter varieties, we then had Janeton (which was my favorite) and two or three other fine apples, larger than Janeton, and much like the Winesap and Nickajack (Joab); and also a very fine green apple, much like Rhode Island Greening. I have not visited this orchard for several years, but I am informed that some of the old trees are still living. I have seen the Nickajack in several old orchards in this county, and it is one of the finest keeping apples we have, and will sell well in spring so long as people are governed by appearance rather than quality.

Within the last eight or ten years many young orchards have been planted, comprising nearly all the varieties usually grown by Western nurserymen. My experience, however, is mostly with trees six to nine years transplanted, and from three to five years in bearing. Soil a rich sandy loam, with a clay subsoil; subsoiled to a depth of fifteen inches; holes dug two feet square; trees two years old from the nursery, planted shallow; pruned low; cultivated in hoed crops the first five years, and then sowed down to clover and orchard grass, with a liberal amount of barn-yard manure applied during cultivation. Result: A very rapid wood growth and a great many insects, but on some varieties good fruit annually after the third year from planting, until the past season, which was almost a failure.

VARIETIES.

Among those that do best as summer, is Red Astrachan. It had a few specimens the fifth year, and continues to be more productive from year to year; but last year the fruit was very wormy. Red June bore none until the sixth year. It seemed at first to be a shy bearer, but is now more productive. Early Harvest a shy bearer, but fine fruit. Duchess of Oldenburg, said to be fine ,but not tested on my grounds..

Autumn—Buckingham (Fall Queen) in much favor, but not tested on my grounds. Maiden's Blush very good, but not prolific. Fall Wine very good, a little inclined to speck.

Winter—Among the best are Winesap, Ben Davis, Huntsman's Favorite, Wagoner, Rome Beauty, Nickajack, White Winter Pearmain—the last very good, but not prolific on young trees. The Belle-flowers are sound, but as yet very poor bearers, and are often killed by late spring frosts. They are very fine, but in my opinion, the Huntsman should take their place. This fine apple is hardly to be surpassed in quality; it is large, of rich, fine flavor, bears regularly, and though not very productive at first, it is more productive as the trees become older. If its keeps improving in productiveness, I shall regard it as one of the best. But I desire to remark here that, for early and prolific bearing, I have never seen anything to equal the Winesap, and next the Ben. Davis. My old favorite, the Janeton, has not yet done well with me. My eight-year-old trees have borne but very little fruit, and that not entirely sound. I have, also, similar reports from others. There are other varieties of which I would like to speak, but fear my report will be too lengthy. I will add, however, that there are over sixty varieties grown in this neighborhood, many of which promise well, particularly among the crabs. One of my neighbors, Col. G. C. Thilenius, who is one of our most energetic and best informed fruit growers, has over fifty varieties of apples, over twenty of peaches and pears, about fifteen of cherries and fifteen of plums—altogether a large orchard, comprising several hundred crab apple and dwarf pear trees, though most of them are too young to enable him to form a correct opinion of their respective value. I am, however, indebted to him for some of the suggestions contained in this report, and find that his experience as to varieties coincides pretty well with mine. But to conclude as to the varieties of apples, I will just say that, from my present experience, if I were to select the best six winter apples for profit, I would take Winesap, Ben Davis, Huntsman's Favorite, Rome Beauty, Wagoner and Nickajack.

DISEASES OF THE APPLE.

Being a novice in fruit culture, I will not impose upon your patience by advancing any of my theories upon the diseases of the apple or its insect enemies; but with the view of getting information upon the subject, I desire to refer to some that give us most trouble, viz: root blight (as I term it), bitter rot and the apple worm. Of course we all have wormy fruit, and perhaps will never be entirely without it, but feel that we have a partial remedy by keeping hogs in the orchard, or picking up all defective fruit as fast as it falls, even shaking the trees to get it out of the way; but when the roots of trees decay, the tops looking green and well until they bloom and the leaves come out, and then die suddenly, or where whole orchards, without regard to varieties, are affected with bitter rot, our wits are at an end. Out of six hundred trees planted in the spring of 1870, I did not lose a tree until the third or fourth year, when, to my surprise, six or eight fine, large trees (mostly Winesaps) died suddenly just after leafing out. I took them up, and found the roots and crowns entirely decayed below the graft, while above the place of grafting they were green and fresh and had made a growth three to four inches in diameter; below the graft they had grown scarcely any since planting. I could find no trace of insects, except occasionally where very rotten, the common white grub. Whether these trees were defective at the time of planting, or whether they died from some after disease, I do not know. I have no bitter rot in my orchard. One of my neighbors says it is because my trees are too young. His orchard is badly affected throughout; but I do not think, among his winter varieties, he has many, if any, of the now popular varieties. His orchard is very old and the ground somewhat impoverished. The trees, I think, are not so well cared for as when the owner was in his younger days, for he is an old fruit grower. He thinks it is the work of an insect, which I doubt; but whatever be the cause, if the trees were mine, I would (as suggested by Dr. Warder) try high cultivation, heavy pruning, scraping, liming, manuring, etc. The gentleman referred to was once a successful fruit grower in St. Louis county, is an old personal friend of your worthy president, and is exceedingly anxious that the subject of bitter rot should receive the attention of your society. And, inasmuch as it prevails to a large extent, I have given it this prominence.

PEACHES.

The varieties that have done best here are Troth's Early, Early York, Old Mixon Free (best), Old Mixon Cling (best), and Red Rareripe. Alexander's Early fruited with me for the first time last year, ripening ten days earlier than Hale's. They were sound, fine looking peaches, but poor in quality. The Hale's were poor also; in fact I could see no difference, except in time of ripening. Peaches, generally, were not good last year, except those ripening in the warmest weather. They lacked sugar—were watery, flat and insipid. Trees were overloaded with fruit, and many peach orchards broken to pieces. Now that the peaches are about all killed, will be the time to severely cut back the trees that have become overgrown and broken—even if cut back to stubs, they will make a vigorous growth of new wood next summer, and possibly in 1880 we may be favored with another fine peach crop.

PEARS.

Those in most favor here are Doyenne d'Ete, Clapp's Favorite (fine), Osband's Summer, Beurre d'Anjou, White Doyenne (best), Flemish Beauty (very fine), Sickel (best, very sweet), Duchess d'Angouleme, Bartlett, Lawrence, Vicar of Winkfield and Winter Nelis. Pear culture seems to be very promising. We have blight occasionally, but not much after the second and third years from transplanting.

PLUMS.

But little success is had with any varieties of this fruit, except the Chickasaw and Wild Goose. The Chickasaw was especially very fine last year. Occasionally some of the finer sorts succeed well.

CHERRIES

Are but little cultivated. The May Duke and Early Richmond have the lead. Rentz Morello and English Morello do pretty well, but the sweet varieties are uncertain.

RASPBERRIES

but little cultivated, except the Black Caps, and they much neglected. I have several varieties, both red and black, that I am much pleased with, and cannot imagine why so fine a fruit is so much neglected. Of the black, we place Mammoth Cluster at the head of the list, and of red, the Turner.

STRAWBERRIES.

Out of a large number of varieties, I think most of Miller's Seedling and Triumph of Cumberland; but have several new sorts of fine promise, but not well tested.

GRAPES,

though placed last on the report, are to be by no means regarded as least in importance. More is known of the vine here than any other fruit. Many thousands of dollars have been expended in this locality in grape growing and wine making, and many thousands of it lost. In other words the investments were too large at the beginning of the enterprise. Some growers are digging up their vines and replacing them with other varieties, and others are about to abandon grape culture altogether, but I am not discouraged, having expended but little, not even providing wire trellis, but by tying to stakes, which are cheap, and cultivating both ways, and instructing common farm hands how to do the work, I have greatly lessened the expense of cultivation; and though some varieties fail and others are not good, still, I believe, my profits from the vines, to say nothing of the pleasure, are about as much as they would be, if the same ground were cultivated in wheat or corn. It is true that we have but little success with red or finer sorts, but I verily believe there is a good time coming—a time at least when we will raise grapes good enough, if not the best. On my own grounds I have two kinds not subject to rot, mildew or leaf blight, viz: Ives' Seedling and Norton's Virginia Seedling. The Ives are planted alongside of Concords of the same age, and for several years, when the Concords all dropped, the Ives were good. These two varieties do not bear full crops every year, the vines seem to bear alternately; that is, a vine that bore heavily last year is apt to have a light crop next year, but take them altogether the average is good. The general average last season, as far as it came to my observation, was about as follows: Ives, 3-4 of a crop; Norton's, 1-2; Gœthe, 1-10; Concord, 1-20; Martha, 1-10 on young vines, but old vines little better than Concord; Taylor, 1-10; Hartford, 1-20; Herbemont, 1-20. My friend Col. Thilenius, reports favorably on Cynthiana and Elvira. I have not examined them. All however, that are regarded with much favor here, are the Ives, Norton, Cynthiana, Elvira and Martha. I am highly pleased with the wine of the Ives. Some persons do not like it, but I prefer it to the Norton Seedling wine, as do all the members of my family. Many remark when testing various samples, "that the Ives is the only wine that tastes just like the grape."

CULTURE.

As to culture, there are so many theories already that I hardly dare to advance one, or to trust to my own convictions; but before I drop the subject, I will simply say that I doubt the propriety of plowing in the summer, while the vines are making their most vigorous growth. It may do in some seasons, but I have had as good, and, I think better, success by thorough spring working both ways with plow and cultivator; then allowing clover, grass and weeds to grow, until hot dry weather, when they were mowed and left on the ground as a mulch. Neither do I believe in too much pinching back or tampering with the vines late in the season. I thin out all surplus shoots in spring; pinch back once when the vines get near the top of the stakes. They will then spread out and form a kind of canopy, or shelter at the top, under which the grapes are partially protected. I allow the vines to run back from the top of stakes down to the ground again, and even sometimes across the rows.

Let it be borne in mind, however, that I have no well-settled theory on the subject, but have hastily and imperfectly hinted out some impressions that have been made upon my mind from observation.

THE COMING FRUIT CROP.

We have had colder weather than for several years past, the thermometer going as low as 14 degrees below zero in the most exposed places. And I regret to report that it is thought here that peaches, pears and cherries are about all killed. One neighbor reports peaches about one twentieth left; pears and cherries all gone. Apples and hardy grapes are uninjured. Yet we ought not to be discouraged. Such winters come very seldom, and though we may not have peaches, pears or cherries, we are apt to have other fruit in great abundance. This barren condition of some of our trees will give us a chance to prune and cultivate, and will render the trees more vigorous and prolific for another year. And so, too, the cold weather and barren trees may put a check upon many insects, heretofore so numerous.

So far as I am concerned, I shall continue to plant, cultivate and experiment. There is not, in my opinion, much danger of over-production of fruit for a long time to come. All the poor fruit may be profitably fed to hogs, the better portion of it converted into cider and vinegar, and the choice fruit, if properly managed, will always find a market.

The demand for fruit is on the increase, and as supply is greater the demand will be greater. People will eventually learn that good ripe fruit is natural and wholesome food for man, and intended by the Great Creator as indispensable to his well being.

In conclusion, I must express my regret that I cannot meet with you next week, as also the wish that your labors may be both pleasant and profitable, and that horticulture in this great State may be successful beyond our fondest hopes.

HAMILTON G. WILSON.

The following report was presented by Wm. Stark of Louisiana, vice president for the thirteenth district:

REPORT OF THE THIRTEENTH DISTRICT.

Taking all kinds of horticultural products into consideration, the results of the past season were not altogether satisfactory. The apple in this section of Missouri, is, as a rule, of much more value than all other fruits combined, but last season the crop did not aggregate more than one-fourth of an average. The trees were generally in a fair condition, and the causes of a short crop are involved in much uncertainty.

In my opinion, the two principal causes were, that the trees bore very full last year, and that blooming very early last spring, the fruit was killed by the cold and damp weather which ensued. Still this section produced a considerable amount of apples for shipping, and furnished ample supplies for the vinegar manufactories; two of which in Pike county, operate quite extensively—that of H. S. Carroll & Co., at Clarksville, and that of Hassler & Bro., at Louisiana—both of which have built up a first-class reputation for making the best of pure apple vinegar. Although the apple crop is of much more value commercially and otherwise, than any other fruit crop, still these partial failures urge the importance of cultivating a full line of all the valuable fruits, for often when we have failures or short crops of some varieties, we have the best of crops of others.

Every family in the country, having suitable and available ground, should plant and cultivate for their own use, the strawberry, raspberry, gooseberry, currant, grape, plum, cherry, peach, pear and apple. With a crop of all these, ripe fruit can be enjoyed every day during the year. The apricot does well when favorably situated, and when the seasons are favorable, it is then one of our most delicious fruits; but as a rule it does not do well. It matures about as early as the peach, and should be planted by those having suitable locations for it. Having tried the nectarine more or less during a period of thirty years, I have now decided that it is much harder to produce than the peach, and of much less value when produced. The small fruits were generally profitable last season. Strawberries continued bearing a long time. Raspberries gave a good crop, but were somewhat injured towards the end of the season by the excessive drouth, especially when they lacked cultivation. The same may be said of blackberries. The earlier varieties of peaches gave a good crop. The late ones, especially where the trees stood on uncultivated ground, gave a very poor yield, both as to quantity and quality. I observed several times during the drouth, the orchard of Mr. M. H. Miller, who lives near Louisiana, and who is one of our most extensive peach growers, and came to the conclusion that his crop, particularly where the trees were bearing very full, would have been worth much more if he had given his trees better cultivation as he had done in previous seasons. Pears, as a rule, did very well, and the trees suffered less from blight than usual. Much of this exemption from blight may, I believe, be attributed to the very mild winter of 1877–78, notwithstanding some of our theoretical horticulturalists believe differently. Some dwarf trees which came under my observation, and which had been thoroughly cultivated every season since the spring of 1873, when they were planted, have a very heavy crop of splendid fruit. Although these trees had borne a considerable crop of fruit for two or three years before, yet I think the crop of '78 alone would more than repay the entire cost of the trees up to this date.

Before closing, I shall indulge in a few comments on some special varieties.

The new early peaches have, I believe, mostly fulfilled the highest expectations entertained of them, when less known. Trees, one hundred miles north of St. Louis, heavily laden with fruit from the 15th to the 20th of June, was a sight never before beheld so early in the season.

Amsden's June and Alexander both bore well, and ripened their fruit last season between the 15th and 25th of June. These were very closely followed by the Early Beatrice, Early Louise and River's Early; all coming in before Hales' Early. Amsden and Alexander are much alike, doubtless of kin, and I believe the Alexander has the advantage in size; but I have found no difference in their time of ripening, even when, as in one case, I had both on one tree. The Beatrice is rather small, but is highly colored, of good quality and hardy. It is worthy a place in every family orchard, and besides ships and sells well. Louise is hardy and of good quality, but is not handsome or highly colored, and as it comes in so soon after the Beatrice and is superior to it in no respect, I think it may very well be dispensed with. River's Early is large for an early peach, and possesses a good quality, but was damaged some last season by rotting. Because it fills a place between Beatrice and Hales' Early, I think it should have a second trial. Two late white peaches, the Silver Medal, a freestone, and Wilkins' Mammoth, a cling, lately introduced into this country from Delaware, have commenced bearing and are giving good satisfaction. The Missouri Beauty, a new white cling, of large size, ripening about ten days before the Heath, and originating with my neighbor, Mr. Miller, is a very promising variety, but is not fully tested yet.

The Utah Hybrid cherry (so called,) which was, a few years ago, so widely proclaimed over the country, and which was sold at fabulous prices by traveling agents and peddlers, purporting to represent Ohio nurseries, has proved to be utterly worthless as a fruit—a full fledged humbug with no redeeming qualities. Mine came from "head-quarters," and seem to me to be nothing but a very small, insignificant, worthless and bitter plum—"sour grapes." The trees, or more properly bushes, will bear while very young, but the fruit is about as unsaleable as the wild cherry of the forest.

The Miner plum (if we have the genuine variety,) is a very ordinary thing, entirely unworthy of cultivation, though the tree is very hardy and bears young. The Wild Goose plum is giving good satisfaction. The fruit is of good size, quality and color; and although not entirely proof against the attacks of the curculio, as has been claimed, still it withstands to a very great degree, the ravages of that insect, and I had trees five years from the bud that matured a crop last summer. "Forest Rose" is a native plum, very hardy and valuable, round in shape, very dark red, but larger and later than the Wild Goose. It is very highly appreciated by those who have thoroughly tested it.

The Greeg seems now to be the most prominent candidate for public favor among the blackcap raspberries. It is a new sort, and bore its first berries with me last season. It is of large size and good quality, and will doubtless prove a valuable acquisition. Among the red raspberries, the old Turner has been constantly growing in public favor, and its popularity has been *honestly obtained*, as nobody has purposely undertaken to boast its good qualities. It is reasonably hardy, and is a very strong grower.

Although it will repay care bestowed upon it, yet it will bear perhaps as much neglect as any thing in the whole catalogue of fruits. It requires a good soil, and when it gets this and thorough cultivation for a season or two, it will produce fair results with as little care as is usually given to a patch of cockle burrs or Jamestown weeds. The Thwack, a new red variety, has been more fully tested over a larger scope of country than heretofore.

It is reasonably hardy and productive, of good size and color. Continues ripening for some time, and is probably the finest and best shipper of all the red varieties. Like the Turner, it is almost thornless, and what thorns it has, are near the bottom of the canes, so as to not interfere in the least with gathering the fruit. The quality is not quite good enough to give satisfaction as a table berry.

The disposition on the part of the farmer to plant a full assortment of fruits, seems to be drifting in the right direction. When we consider the great enjoyment to be derived from a full supply of good fruits almost the entire year, the wonder is that so many have shown themselves laggards and drones in this fair and prolific country.

To take another view of this subject, I feel safe in saying that a good supply of the best "home grown fruits" is one of the cheapest articles of diet, and, at the same time, one of the greatest factors in promoting health, without which all else is comparatively worthless. In fact, fruits, in the many ways in which we can now prepare them, have become with some, and should with all, a necessity. There are very many causes contributing to unsatisfactory results in the culture of the various kinds of fruits. One is that too many worthless varieties, or varieties of comparatively little value, are planted. Another is the want of proper care in the treatment of the trees, vines, plants, etc., after planting. Good cultivation is a prime necessity in the production of large and continued crops of good fruit. I do not wish to be understood as advocating the culture of all the varieties every season, but I do wish to say, in the most unequivocal terms, that to obtain good results, the plants must be so treated as to continue in a vigorous and healthy condition. Then let the watchword be, Cultivation! cultivation!

Recess.

EVENING SESSION.

Meeting called to order at 7:30 P. M., by the President.

C. W. Murtfeldt, of St. Louis county, read a paper, entitled

A PLEA FOR AGRICULTURE, HORTICULTURE AND OUR AGRICULTURAL COLLEGE.

MR. PRESIDENT AND GENTLEMEN: It is not difficult for me to imagine that you would like to ask the question: Why do you desire to speak here and at this time, and why do you intrude upon our time and patience? I answer that I wish to make a plea for agriculture, horticulture and our agricultural college.

It will be my task to do this as briefly and as logically as I may have the power of language. The fascinating power of eloquence and rhetoric is not mine, much less the keener but more dangerous weapon of sarcasm, nor yet the skill of word painting and brilliant imagery by which I could hope to fascinate, beguile and hold your attention; all these are not adapted to my theme. I will, therefore, try to tell a plain, unvarnished story, and after that ask you to test it in the cruci-

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ble of truth, and make the application, and in so doing I shall embrace the opportunity to appeal to your patriotism, your intelligence, and to the responsibility which you assume by taking your oath of office. I mean, of course, those gentlemen who are members of this general assembly.

Many thoughts and expressions are called trite, stale, flat and commonplace, when used by a man in humble life, like myself, yet these same words in the mouth of a Governor or the President are applauded to the echo, and declared to be eloquent and full of truth and importance. With all due deference to the honors and superior wisdom and ability of distinguished men, I declare to you that I believe these trite sayings are as weighty and powerful and worthy of your attention when uttered here to-night, as when voiced by the mightiest intellect or the highest official of the State or nation, always provided that the speaker himself fully understands the use of words.

In a general estimate of the rank of States, we are apt to take into consideration the population and the extent of territory. Judging by the first, Missouri ranks 5th, and judged by the second, 6th, having an area of 65,350 square miles. But there are many other important factors which must be taken into consideration, before we can make a true estimate. Among these I name the universal intelligence of the people, the productiveness of the soil, the natural advantages of large rivers, of great and varied mineral wealth, and more than all, of wholesome laws, made by the people and for the whole people, the high and the low, the rich and the poor alike, and a people who respect and obey these laws. Allow me to repeat the question: What constitutes the real greatness of a people? Is it simply a dense population? If so, China to-day, is the greatest nation on the earth. Is it extent of territory and population combined? Then Africa is in the van. Every one of my hearers objects to such a classification. Rome and Greece in the zenith of their power were great, not only because of the extent of territory and the numbers of people over which their monarchs held sway, but because of their superior intelligence and civilization of their people. France, Great Britain and Germany to-day are great, because of their Christian civilization, of their advancement in art, literature, science and knowledge. But there is one nation which we think, if not superior, is at least equal to and fully abreast with any nation on the face of this round globe, and that is the people of these United States, of which you and I are a part, and are patriotically and pardonably proud. Let us see how we compare with the empires first named: France has in round numbers, a population of a little over 36,000,000; England and Great Britain about 35,000,000, (of course, neither Great Britain, France nor

Germany can at all compare with the United States in extent of territory,) Germany nearly 41,000,000, and the United States now 45,000,000. It would seem, therefore, that in point of numbers we are ahead of all three, viz.: France, England and Germany. Comparing ourselves among ourselves, let me point you to Massachusetts. In point of territory, she ranks 34th, and in point of population 6th, 1,651,652 in 1875 only; but notice what a mighty influence she wields in the councils of the nation, in commerce and manufactures, in literature, art and science; look at her schools, colleges and universities, and her enterprise. Judge her by these, and what rank does she hold? No. 1, unquestionably. Speaking of the sagacity and enterprise of her people, allow me just here to mention one fact. Boston had a railroad to Albany and the lakes before New York had, and it was only by the desperate efforts of men of intelligent forecast, who in vision saw the commercial glory, as well as the wealth of New York, transferred to Boston, that the merchants of New York were aroused to the fact that the Hudson, closed for part of the season by ice, formed but a precarious and insufficient commercial connection with the capital of the State, and from there with the rich and wide expanding West, and that a railroad running along side of the river, was a dire necessity, and it was built.

A little further on, I may refer to a necessity of our great State, which some of our law-makers of former legislatures failed to see or to appreciate, and in consequence Missouri has lost, or rather failed to secure a hundred thousand inhabitants, to help swell the aggregate products of her fields, her forests and her mines. You ask what has become of these hundred thousand. I answer they have swelled the population of Kansas and Nebraska. They have helped to raise thirty millions of bushels of wheat in 1878, which placed Kansas as a wheat-growing State, from number eleven to number one, and to raise the corn, which makes her rank fourth, where the year before she ranked eleventh.

Our great State is naturally well adapted to all the productions of the temperate zone, and to others that require a semi-tropical climate; her forests are full of valuable wood, used in the manufacture of furniture, carriages and for building purposes, her mines are rich and productive, even with the most primitive and crude apliances of the common miner; we have mountains of iron, zinc, nickel, lead and coal, etc. Our fields under skillful cultivation, produce the finest of wheat, corn and other grains. Our farms and meadows, natural and artificial, are capable of sustaining vast herds of cattle, swine and sheep, while our orchards are loaded with the luscious peach, the juicy and aromatic pear, the tempting cherry, the highly flavored quince and the king of fruits, the apple, of such various forms, colors and flavors as are suited to every taste and caprice.

Gentlemen, I am speaking advisedly, and you will bear me out in the assertion that the agricultural interests of Missouri are paramount to all others, and that in building these you build up every other interest. These secure prosperity to the people at large, these load your trains and steamers, these sustain your manufactures and merchants, these fill your warehouses, your packing houses, your mills and your stores, and make business for your express companies and your railroads? Yes, I assert these interests build and support your schools, your colleges and your universities and your churches, they sustain your courts, enforce your laws—by public opinion—and are the bulwark of your defense in time of trouble. Listen, if you please, while I quote a brief paragraph from the message of our chief magistrate:

AGRICULTURAL.

From the organization of the Government, the importance of encouraging, by all possible means, the increase of our agricultural productions has been acknowledged and urged upon the attention of Congress and the people as the surest and readiest means of increasing our substantial and enduring prosperity.

The words of Washington are as applicable to-day as when, in his eighth annual message, he said: "It is to be doubted that with reference either to individual or national welfare, agriculture is of primary importance. In proportion as nations advance in population and other circumstances of maturity, this truth becomes more apparent, and renders the cultivation of the soil more and more an object of public patronage. Institutions for promoting it grow up, supported by the public purse—and to what object can it be dedicated with greater propriety? Among the means which have been employed to this end, none have been attended with greater success than the establishment of boards composed of proper characters, charged with collecting and diffusing information, and enabled, by premiums and small pecuniary aids, to encourage and assist the spirit of discovery and improvement, this species of establishment contributing doubly to the increase of improvements, by stimulating to enterprise and experiment, and by drawing to a common center the results everywhere of individual skill and observation, and spreading them thence over the whole nation. Experience accordingly hath shown that they are very cheap instruments of immense national benefit.

The great preponderance of the agricultural over any other interest in the United States, entitles it to all the consideration claimed for it by Washington. About one-half of the population of the United States is engaged in agriculture. The value of the agricultural products of the United States for the year 1878 is estimated at $3,000,000,000. The exports of agricultural products for the year 1877, as appears from the report of the Bureau of Statistics, were $524,000,000. The great extent of our country, with its diversity of soil and climate, enables us to produce, within our own borders and by our own labor, not only the necessaries, but most of the luxuries that are consumed in civilized countries. Yet, notwithstanding our advantages of soil, climate and intercommunication, it appears from the statistical statements in the report of the Commissioner of Agriculture, that we import annually from foreign lands many millions of dollars worth of agricultural products which could be raised in our own country.

Numerous questions arise in the practice of advanced agriculture which can only be answered by experiments, often costly and some times fruitless, which are beyond the means of private individuals, and are a just and proper charge on the whole nation for the benefit of the nation. It is good policy, especially in times of depression and uncertainty in our business pursuits, with a vast area of uncultivated and hence unproductive territory wisely opened to homestead settlement, to encourage, by every proper and legitimate means, the occupation and tillage of the soil. The efforts of the Department of Agriculture to stimulate old and introduce new agricultural industries, to improve the quality and increase the quantity of our products, to determine the value of old or establish the importance of new methods of culture, are worthy of your careful and favorable consideration, and assistance by such appropriations of money and enlargement of facilities as may seem to be demanded by the present favorable conditions for the growth and rapid development of this important interest.

The abuse of animals in transit is widely attracting public attention. A national convention of societies specially interested in the subject has recently met at Baltimore, and the facts developed, both in regard to cruelties to animals and the effect of such cruelties upon the public health, would seem to demand the careful consideration of Congress, and the enactment of more efficient laws for the prevention of these abuses.

Again, ex-Gov. Seymour of New York said in effect, at a recent Dairymen's Convention, that it would not effect the common wealth of New York as injuriously to have every bank in the State wiped out as to obliterate the dairy interest of the State, and this is only one branch of agriculture.

I regret exceedingly that I have not the privilege to quote from the recent message of our honored Governor, so I will ask pardon, if in this connection, I quote on this all-important topic from Gov. Cullum of Illinois. Please give attention; the Governor says:

"Illinois is pre-eminently an agricultural State, and causes likely to aid in the more rapid development of our agricultural resources should receive careful attention. Our soil and climate are peculiarly adapted to the profitable production of a great variety of crops. Much the larger portion of our people are engaged in agricultural pursuits, and a proper recognition of this wealth-producing class, I trust, will not be overlooked in your deliberations. Legislation for the protection of sheep, and for the prevention, as far as possible, of diseases among farm animals, is especially demanded.

"The Department of Agriculture, under the control of the State Board of Agriculture, has rendered the State valuable service and deserves more than a passing notice. The reports of the condition of the growing crops, published by that department in monthly circulars, are highly valued by all interested in our productions. Complete statistics of the agricultural resources of the State are most useful, and whatever legislation may be deemed necessary to secure them, and insure their accuracy, should be adopted.

"The State Agricultural Museum, as an advertisement of our varied resources, and as a means of exhibit of our products to our own citizens and visitors from abroad, promises, when complete, to be a valuable collection, and is worthy of support.

"I recommend the usual appropriations in aid of the Department of Agriculture of the State Horticultural Society, and for the expenses of the State Entomologist.

"Closely allied to the interests of agriculture is the improvement of the common highways. We need better roads for the transportation of farm products to market. Bad roads at certain seasons of the year form one of the great disadvantages of our rich soil, and I think there can be some plan devised by legislation to encourage their permanent improvement.

"The Thirtieth General Assembly submitted an amendment to the Constitution, providing that the General Assembly may pass laws permitting the owners of lands to construct drains, ditches and levees for agricultural, sanitary and mining purposes, etc. The proposed amendment was voted upon at the last general election, and was ratified by a very large majority of all the votes cast. The subject of drainage is one of great importance. Millions of bushels of grain may be added to the crops of our State by the proper drainage of our level lands. The amendment to the Constitution will now permit such legislation as may be necessary to carry out any reasonable system of drainage in the interest of an increased production of the soil and the improved health of the people.

"The reports of the Railroad and Warehouse Commissioners for 1877 and 1878, which will be laid before you, contains much valuable information relating to the condition and operation of railroads and the shipment and inspection of grain. The report for 1878 shows a substantial increase in the tonnage and earnings of railroads in 1878 over the amount in 1877. This fact, I think, may be regarded as an evidence of returning prosperity to the country. The growing disposition of the railroad corporations to recognize the authority of the commission in all matters subject to its control, is noted with satisfaction. The commissioners have done all in their power to enforce the law in relation to railroads and their operation. They are met by many embarrassments and difficulties, which they have pointed out and discussed in their report, to which I ask your attention. Nearly half the States have established Boards of Railroad Commissioners, and many other States are likely soon to do so. I think the people of the country are convinced of the importance of maintaining such a commission, and that corporations created by the State must be subordinate to its sovereignty.

"I recommend that the law creating the office of Railroad and Warehouse Commissioners, be amended so that the term of office be four years instead of two.

"The Grain Inspection Department, under the control of the Railroad and Warehouse Commissioner, is now administered with very general satisfaction to all concerned. The shipments to Chicago, reported by the Chief Inspector, for 1878, show an enormous gain over 1877, and the fact that the business of inspection is so well managed, is increasing the public confidence in the wisdom of State inspection."

If anything more is needed to fortify my position and to give force to my remarks, I beg you to listen to a few, very few words, eloquent with facts, obtained direct from the chief of the bureau of statistics at Washington.

TREASURY DEPARTMENT,
BUREAU OF STATISTICS,
WASHINGTON, D. C., Nov. 21, 1878.

C. W. Murtfelt, St. Louis, Mo.:

SIR:—In reply to your letter of the 15th inst., I enclose to you a statement, showing the total of exports of domestic merchandise, (specie included,) and the portion of such exports which were agricultural products, in the raw or slightly manufactured state in which they first enter the market of the country.

Very respectfully yours,
JOSEPH NIMMO, JR.,
Chief of Bureau.

EXPORTS OF DOMESTIC MERCHANDISE FROM THE UNITED STATES.

Year ending June 30.	Total exports of Domestic mdse........	Exports of Domestic Agricul. products.	Per cent. of Agricultural products to total exports of mdse.
1871	$478,115,292	$368,278,292	77.03
1872	476,421,478	368,852,972	77 42
1873	575,227,017	446,968,172	79.70
1874	633,339,368	501,844,279	79.24
1875	559,237,638	430,575,923	77.00
1876	594,917,715	456,429,995	76.72
1877	632,980,854	459,439,233	72.59
1878	695,749,930	536,035,965	77.05

Total Exports of Domestic Merchandise	$695,749,930
Total Exports of Agricultural Products	536,035,965
Total Ag. Balance	$ 59,913,965

And in this connection I cannot do better than to quote once more from one of the best, because most truthful editorials, ever written for the Missouri *Republican*, in 1877:

"It is a remarkable proof of the importance of the farming class in our economy, that all estimates of national prosperity and misfortune are based on it. We are told the country is beginning to revive, after a long prostration that occurred in September, 1873, and as a proof, we are pointed to the crops of the present year. These crops are the burden of all cheerful prediction, the inspiration of all hopeful enterprises. The bankers of New York assure the country of better times, because it has produced a bountiful crop; the national credit improves steadily for the same reason; we are told we can resume specie payment in 1879 without difficulty, (an accomplished fact and a verified prediction,) because we have a crop that will command all the gold that resumption calls for; and merchants, real estate dealers, manufacturers and all other classes whose welfare depends on the general prosperity, predict an improvement in business, because the land is full of grain, hay, cotton, sugar and rice." (And allow me here to add that the balance of trade is now in our favor, at over two hundred and seventy-three millions of dollars which is paid to us in gold or its equivalent, viz: U. S. Bonds.) I quote:

"These predictions are reasonable, and they show what are the foundations of our prosperity. Stacks of unsalable pig-iron and mountains of unsalable coal in Pennsylvania, and gluts of manufacturers in Massachusetts, are signs of suffering rather than comfort, for they tell of over-productions, diminished consumption, paralyzed industry, and idle and hungry people. But stacks of harvested crops have a different signification. They mean wealth, business, employment, prosperity and comfort.

"There is a lesson in this which ought to be heeded. Our prosperity rests on the shoulders of the farmer! If he suffers, his pangs will sooner or later run through the whole country. An unjust burden imposed on him is a strain on the very props of society. Statesmen, publicists, financiers, economists and reformers forget the silent and patient tiller of the soil in their espousal of the claims of more clamorous and demonstrative classes; but it is always at the peril of the country. We have interminable discussions about manufactories, mining, banking and railroading, and laws after laws enacted for the benefit of these interests, with nothing ever done, and little dreamed of for the benefit of that great agricultural interest, on which all others rest; and yet, it is the product of the farmer's labor that maintains the sea-board cities, makes five-sixths of our commerce, sustains manufacturers, and gives employment to railroads. Farmers do not ask for special favors, but enlightened statesmanship demand, at least, their exemption from the effect of special favor to other classes. If the government will not protect them, let it, at any rate, cease to protect other classes at their expense."

"At the beginning of the new year everything is in our favor. We have the largest crops of corn, wheat and cotton ever harvested in the country, and there is a certainty that each of these staples will command a fair price. Our farmers have been steadily improving their condition for several years, and are now freer from debt than at any time since the close of the war. Our manufactures are receiving increasing orders for their wares from home and foreign markets, and the hum of machinery fills the land. From all quarters reports come, showing that our merchants are preparing for largely increased trade—'Brightening Skies.'"—*Globe-Democrat.*

Having thus plainly, and I hope truthfully shown, not only in my own feeble words, but in the language of presidents, governors and statesmen, the vast and paramount importance of agriculture in Missouri, as well as in the nation, let us see what has been done, and what can be done to encourage and enhance this great source of individual and national prosperity! Nearly twenty years ago Prof. Turner, of Illinois, and other far-seeing men in that State, recognizing the great fact that the general practice of farming was not based upon sound economy, and the laws which govern the physical and vegetable kingdom, but was, in fact, calculated to impoverish the land, the farmer and the nation, and that superior intelligence and skillful art alone could keep up to the *maximum* of productiveness the great body of our arable lands, and that the time was fully come when the migratory spirit of our rural population, as well as the skinning process of her farming must be stopped, appealed to Congress, and Congress in due time enacted a law, since known as the congressional land grant act, for the establishment of at least one agricultural or industrial college in every State, that should, within a cerain time, manifest a willingness to accept such a trust, and comply with certain other conditions upon which the land would be ceded to the State. No doubt you all are familiar with these conditions. Missouri is found among the States accepting the trust, and stands pledged to the conditions. Your predecessors having thus entered into a solemn compact with the general government of the nation, you are in duty bound to carry out the conditions on which Missouri was made a partaker of the national bounty, and received her 330,000 acres of land.

Gentlemen, you are the representatives of a great State, yes, if you so will and elect, and if you wisely legislate, one of the greatest, if not the Empire State of the whole sisterhood! There is not a State in the Union which has greater possibilities and more varied natural advantages than Missouri. Illinois may have richer soil and broader prairies, larger herds and greater flocks, but she cannot compare with Missouri in her vast mineral wealth; and so I might go on, and in turn compare her with New York, Ohio, Indiana, Iowa and Kansas, and with Massachusetts, Michigan and Minnesota, with much in her favor all the time, but I forbear, lest I weary you, and besides, comparisons are said to be odious. And yet I beg pardon for making one more comparison, viz.: the manner in which Missouri and the States named, and perhaps others, have redeemed their pledges to sustain and make most efficient their respective industrial and

AGRICULTURAL COLLEGES.

I cannot in the brief space allotted to me, point out in detail, all the special and prominent work which has been and is being done by and in these institutions in the States named, but gentlemen, if any of you desire—and I hope you do—to probe this thing to the bottom, just address a letter of inquiry to the respective presidents, and I doubt not you will receive a courteous and pertinent answer to all your questions, accompanied, perhaps, with the last annual report.

Some of the friends here would ask, why do you refer to this matter here and now? I will tell you. Although but a plain and humble man, and of little consequence, perhaps I am not unknown to the intelligent and reading farmers of Missouri, having been and being now somewhat identified with the agricultural press, and having, by the favor of some here present, held the position of Secretary to the Missouri State Board of Agriculture. Please pardon this reference to self!

Some of the gentlemen, prominently connected with our own State Agricultural College, imagine that I feel an opposition to her interests. I am free to confess that I was opposed to the location and the connection with the State University, but having yielded that point, I have been and am yet opposed, not to the Agricultural College and her best interests, but to the way or manner in which matters there have been conducted in days past. What I desire most is to see Missouri's Agricultural College most prominent, most efficient, most appreciated and most prosperous—in fact, taking rank with the most advanced and best conducted institutions of the same class in the United States, and that she may be so, I desire her to receive that liberal and generous support which the State pledged when she accepted the land grant; and, furthermore, I want her to be built up on her own legitimate foundations, and not to come here and appeal to you for funds or support under any other pretext. I may be in error, but it has seemed to me that since the State Board of Agriculture has been moved to Columbia, that she was to be made a factor in the matter of claims for support. In my humble opinion, the gentlemen composing the faculty, from the Dean down to the farm superintendent, will have their hands full to do their duty in conducting the affairs of the College, and that is all that they should attempt to do. As I said just now, I may be in error, and if so, I beg pardon. In sustaining this institution you are aiding agriculture in general, and let me here quote from the good Book, Prov. xi. 24:

"There is that scattereth and yet increaseth; and there is that withholdeth more than is meet, but it tendeth to poverty." "He that soweth sparingly shall also reap sparingly." You farmers know this to be the essence of truth! Gentlemen, I but a moment ago referred to a State Board of Agriculture, and it was done advisedly. By a mistaken economy—as I think—and in the spirit of so-called retrenchment and reform, so popular a year or two ago, not questioning in the least the honesty of purpose, however, your predecessors withheld the sinews of war, and your State Board of Agriculture, and the office of State Entomologist became extinct; alive in name, but dead in fact; they died for the want of breath, called money! But possibly there may be some one here present ready to say, "I am glad of it; what good did ever our State Board of Agriculture acccomplish?" I will answer modestly, but truly: much everyway. She brought into more favorable notice our natural climatic and geographical advantages; she has shown up on every favorable occasion, our great agricultural and mineral wealth; she has pointed out favorable localities for advantageous settlements, and advised immigrants to examine the claims of Missouri to preference, because of her great natural and artificial arteries of trade and commerce, and advised emigrants to settle within her borders rather than on the distant prairies, far, *too* far away from markets; she has ordered and conducted trials of reapers, mowers, plows, harrows, horse-rakes and other farm machinery, and in many other ways did she her full quota of fostering and developing the best interests of this great commonwealth! And this necessitates that I should go back and once more compare Missouri with some of her more prosperous sisters. To be able to do this correctly, and to obtain official data upon which you may base intelligent action, should you consider it wise and expedient to enact a law providing for an efficient State Board of Agriculture, I addressed a letter to each of the secretaries of some eight or ten States of their respective Boards of Agriculture to which I respectfully requested a catagorical answer. And, gentlemen, permit me a moment to promise that all the States to which reference is made, have a State Agricultural Society, holding an annual fair, and the officers of the State Society are members of, or, with the addition of one or more prominent State officials, compose the respective Boards of Agriculture. It is needless to say that from all the gentlemen addressed, I received a prompt and courteous reply, accompanied by a copy of their last annual report. There is one exception to this, but it shall be nameless here, but any gentleman who may be curious, and wishes to see the document, can do so at his leisure.

If the question were asked of me, what do you consider the legitimate work of a State Board of Agriculture, I could not do better than to answer in the language of the resolution which gave rise to the first Board of Agriculture of Missouri: On page 4 (1870) Mo. Agr. Rep't, Sec. 8, you find: "It shall be the duty of said board to make an annual report to the General Assembly of the State, embracing the proceedings of the board for the past year, and an abstract of the reports of the several Agricultural and Horticultural Societies, as well as a general view of the condition of agriculture and horticulture throughout the State, accompanied by such recommendations, including especially such a system of public instruction upon those subjects as may be deemed interesting and useful." Part of section 5, on page 5, Ibid.: "It shall be the duty of the corresponding secretary, etc., to issue such circulars for obtaining statistics or other information as the board may direct, or as he may deem expedient or useful, to collate and arrange correspondence, and the proceedings of county societies, for report and publication, and to distribute seeds, plants, publications, etc."

The value of official agricultural reports is never fairly estimated by the political press. They cannot be, because, as a rule, the editors, however learned, erudite and well posted they may be in literature, politics, science or political economy, are not good judges of practical agriculture, or things pertaining thereto. They may be, and doubtless are competent judges of etymology and grammar, and the literary merits or demerits of the contents of these reports; but of practical and scientific farming, they cannot judge. For instance, most of these editors, when referring to the national agricultural reports, yet speak of them as patent office reports, ignoring the fact that for more than a dozen years the Department of Agriculture has been a distinct and separate institution, and entirely independent of, and disconnected with the patent office. Intelligent farmers, however, value these reports more accurately, and consult them frequently when occasion requires.

It will be noticed from the letters referred to but a moment ago, that most of the State Boards of Agriculture publish a monthly report, or bulletin, mentioned also as a valuable feature by the Governor of Illinois, in his message quoted in your hearing. In these the conditions of the growing crops are reported from the different counties and sections of the State, also the number, general health and condition of domestic animals, the season, favorable or the reverse; the establishment of new enterprises, such as creameries, cheese factories, etc. It would, indeed, be a work of supererogation to speak to this intelligent audience upon the value of these reports, first to the farmer, then to the merchant, and last—though not least—to the consumer.' All of these must have this information, either through official and reliable channels, or secure it by private and more expensive means, for upon it they base their actions as to supply and demand. Another point for your consideration is the best location for your State Board of Agriculture, for I take it for granted that you will give the matter under consideration your earliest and most earnest attention, and I hope that in framing a new law you will not allow petty, pitiful, partisan prejudices or preferences, if such are entertained by any one, to cloud your judgment, neither will you so construct the new law that the periodical political elections can exercise any baneful influence upon the board. Do the best your calm, deliberate judgment and a pure patiotism dictates, having in view the best interests of the whole people of this entire commonwealth.

And in passing, permit me to give honor to whom honor is due. It is a fact which many of the older members of this general assembly, men who have graced these halls for many a session well know and will attest, that the professional members, men of brains, of mental power and forecast, and acute judgment, and of broad, liberal, statesmanlike views, have ever been more willing to support any measure which had for its object the advancement of the agricultural prosperity of the people, than some of the so-called farmers. God save the mark—who have found their way to these halls from some obscure cross-road district, but to have their names on the roll of members, and then to be lost in obscurity.

And now, as to the best location for the State Board of Agriculture, Illinois, Ohio, Indiana, Wisconsin and some other States located their respective boards at the State capital, and provided such rooms and accommodations for their use as were deemed necessary and appropriate. New York has an entire building, with library, museum, and offices for the Secretary and assistant, and for the botanist and entomologist, and all the States afford ample and secure accommodation.

The General Assembly, in session, February 14, 1870, of Missouri, which authorized the organization of a State Board of Agriculture, located the office of the Corresponding Secretary at St. Louis, and I think wisely, because St. Louis is the great commercial metropolis of the State, a great railroad centre, a very gate city, being on her eastern border, by which most people enter. A city where even Kansas, Nebraska and the more remote States of Arkansas and Texas find it advantageous to maintain agents and permanent offices, in the which they have a full exhibit of all the leading productions of their respective States, so that all seekers of new homes may have ocular demonstrations, and be guided by intelligent and interested directors, and furnished with every possible information. The value of immigration is one of the strong points made by the Governor of Arkansas, in his recent message. I will not weary you with a quotation. Missouri does not, at present, enter into active competition for the privilege of securing an increase to her industrial and producing classes of citizens. I have read with interest the report of your State Board of Immigration. Its members have served the State faithfully, and without fee or reward; but they never had the means to be *aggressive* in their labors to secure immigrants. If Missouri will compete in this field, she must occupy the most advantageous position, and you all will agree that this is St. Louis.

But if the permanent seat of goverment can furnish suitable accommodation, and the superior wisdom of this General Assemby should so determine let the Secretary's office, with its necessary appointments, be located at Jefferson City.

In the discussion which followed the reading of the essay, Mr. Ragan, of Independence, said that Kansas has a better reputation for fruit growing than has any other western State, but that this is largely owing to the fact that she buys Missouri fruit and exhibits it as her own, and so gains credit which really belongs to Missouri. By this course she is securing thousands of immigrants who, if a proper effort were made, could be retained in Missouri. We need a statistician, to show what we are really doing, and so present to the westward bound emigrants our advantages as a fruit-growing State.

Judge Krekel said that he had been engaged in fruit growing since 1832, and had seen the ups and downs of the business. Just now we are down, but better times are coming, and if the work is faithfully pursued, we are certain of success. Agricultural and horticultural pursuits should be encouraged, and more attention should be given to building up the country, and less to building up the city. We should let the world know what we are doing here in Missouri. From present indications he believed there would be an unusually large immigration from England and Germany during the present year, and that something should be done to attract a portion of these new-comers to Missouri, the best fruit-growing State west of the Mississippi River.

Professor Swallow said that as a return for the few thousands expended in making an exhibit in Philadelphia, during the Centennial, Kansas had received over $20,000,000 in cash, in addition to the brain and muscle of the immigrants who had brought it to the State. Missouri lost a grand opportunity then, and should another similar occasion present itself, the State should have sufficient regard to her own interests to improve it.

Hon. H. T. Mudd, Mr. Monaghan, and others, took part in the discussion, which became quite general in nature.

Geo. Husmann of Sedalia, presented the following

REPORT ON SMALL FRUITS IN 1878.

In making this report, I will give my own experience with them, mostly gathered on my own grounds, and the specimen beds of my friend and neighbor, Samuel Miller, who had about seventy varieties of strawberries bearing, and whose enthusiasm for this berry is so well known.

The season commenced with Downer's Prolific; on our own ground the first berries were ripe on the first of May. I am inclined to think it the earliest berry we now have, medium size, exceedingly productive, of good quality, but not large or showy enough and too soft to bear transportation. For family use and as an early market berry at home, I think it desirable, as it always bears and is a good, hardy plant.

Triumph of Cumberland followed a few days later only, and, as friend Riehl remarks, has but one fault; it is too soft for shipping. For home use and home market, I think it hard to beat. Exceedingly productive, large (the largest measured six and a half inches in circumference), fine form, bearing good-sized, glossy berries from beginning to end, and of good quality. Everybody ought to have it, and, as the plant is vigorous and very healthy, I think it is as near perfection as we can perhaps obtain it.

Chas. Downing.—This is also a very fine berry, but, if to be shipped, must be picked before fairly ripe, and does not color uniformly. But those who cultivate it for home use will certainly not be disappointed; for the home market, it also looks very inviting, and is of good quality.

Capt. Jack.—This, as a berry for shipping is without a rival. Fine form, deep scarlet color, contrasting finely with its golden seeds, good size (the largest measuring five and a half inches in circumference), very firm, and of superior quality; it is so far ahead of its parent, the Wilson, that it must take the lead for shipping. It blooms late, but is not a late berry, coming in about a week after Downer's Prolific.

Owing to unfavorable weather during its bloom, it did not set as well here, but at Tipton and other points, produced enormous crops. It can be safely classed among the standard varieties, and friend Miller deserves the thanks of the community for originating and disseminating it.

Kentucky.—This was exceedingly productive with us; a bed of six feet wide and six feet long produced eighteen quarts at a single picking. It is a large, rather soft berry, of irregular shape, but looks very attractive in a box, and sells well, though not of first quality. It is a vigorous grower, bearing the fruit on long stalks, comes in late, and is certainly profitable for late home markets and home use.

Springdale.—This bears some very large and very good berries, but a great many imperfect ones, and burns out badly. On the whole, I do not think enough of it to cultivate it, and would not advise others to do it.

Wilson's Albany was a total failure here this season, and did not pay us for the picking. It may be that the same causes affected the crop that reduced it in Capt. Jack, but I certainly would not cultivate it when I can have Triumph, Capt. Jack and Kentucky. I have not seen a really good box of it in this market this season.

Monarch of the West bears here a few very large and handsome berries, but I have seen nothing in it to induce me to cultivate it.

Great American.—This much lauded berry fruited on friend Miller's grounds and bore a few enormously large, irregular shaped berries, some of them nine inches in circumference. My impression is that it is of indifferent quality, very dull color and rather unproductive, though, as it bloomed late and during very unfavorable weather, it would be premature to condemn it.

Seth Boyden bears large berries of excellent quality, but I do not think it productive enough to cultivate it extensively.

Among others I saw or fruited, were Duchess, Prouty, Afrique, Black Defiance, Golden Seed, Green Prolific, Cherry Tree, Ida and Marie Stuart, none of which impress me favorably enough to plant extensively, nor recommend them to others.

But the marvel of every one who saw it, was a variety which friend Miller has received from somewhere, under the name of the Windsor Chief, but the precise origin of which is unknown. A small, thickly matted bed of it, six feet wide and six feet long, produced seventeen quarts, besides a number of specimen berries, amounting to, perhaps, quart or two more, or at the rate of two thousands quarts per acre. The plant is strong and vigorous, of a grayish-green color; berry borne on a rather short stalk, very large, several specimens measuring seven and a half inches inches in circumference; rather irregular, often coxcomb-shaped; dark red; of good, though not high, quality. It promises to be a very valuable addition to our strawberry list, especially as the plants in the bed were too thickly matted to bring out its full size.

The crop, altogether, was a very abundant one, continuing late on account of the abundant rains, and lasted until raspberries came in, until the second week in June. I supposed that about 30,000 quarts were grown in this neighborhood for market. The prices averaged to the grower about ten cents per quart; the market opened at twenty-five cents, but came down in some instances to six cents. But here as in all fruits, the best grades and nicest looking fruit brought the best prices—choice berries, well handled, selling readily at double the price of small, poorly handled fruit.

Raspberries came in before strawberries had given out, and we picked our first berries the first day of June, while the last strawberries were picked 10th of June. They were also a very abundant crop, and the greater part of the berries which came into this market were of the Black Cap, commencing with a wild variety, cultivated to a certain extent by Mr. J. H. Monsers, which seems to be earlier by a few days than any black raspberry, but is smaller than Mammoth Cluster. Next came Davison's Thornless and Centennial, a very large, handsome and productive berry, which I saw first on friend Miller's grounds. These were followed closely by Mammoth Cluster, a variety so well known that it needs no description here. In my opinion, none of these are worth growing now, when, in the Turner and other red varieties, we have berries just as hardy, much better, more productive, and continuing much longer in bearing. I will, therefore, at once pass them over, and report about the Turner. This ripened the first of June, and contined in bearing until 20th of July, but would have continued much longer, if the severe drouth had not cut off the crop. I think it the berry for every one, for the following reasons: 1. Its extreme hardiness. 2. Its immense productiveness. 3. Long cultivated bearing. 4. Beautiful color. 5. Excellent quality. 6. Freedom of thorns, and therefore easy to pick. 7. Fine size. 8. High price in market.

It has, in my opinion, but one drawback, it is too soft to ship well. Others have also objected to it on account of its abundant suckers, but I hoe them down as so many weed, when I do not want to raise plants, and have had no trouble whatever in keeping them down. We planted in May, 1877, about a quarter of an acre, which bore its first partial crop this summer, 500 bearing plants, large and small, from which we picked and sold 311 quarts, for $66, or a little over an average of 21½ cents per quart. We commenced selling at 30 cents per quart; then dropped to 25 cents, for which about half of the crop was sold; then to 20 cents, and a few were sold at 15 cents per quart. They never brought less than 20 cents as long as the Black Caps were in market, and when they were selling at 8 cents per quart. Our last Black Caps were picked 21st of June, while the Turner lasted until 20th of July, a month later. I intend to dig up all Black Caps next spring, and plant Turner in their place. I think I need not explain why I shall do so. One of the advantages of this plant is its almost overbearing habit. It throws up fruit bearing shoots from the ground, at the base of the bearing canes, consequently it would bear even after such extreme winters as would kill the Black Cap to the ground and destroy their entire crop. These young shoots produce the finest and largest berries. I have picked finer berries the first week in July, than at the opening of the season.

Philadelphia—Smaller than Turner, dull in color, inferior in quality, does not contine as long, and consequently not worth cultivating when the Turner can be had.

Brandywine—About as large as Turner, but not so handsome nor as good as it, nor do I think it will bear so long.

Delaware—Full as large as Turner, but neither as good, nor as handsome as it.

Thwack—Very handsome and very productive, but not as good as Turner; in fact, very inferior for home use. But it is the firmest berry of all, and will bear shipping to any distance. This is its chief merit, and those who wish to plant for shipping purposes, will do well to cultivate it, as it has the same habit of long continued bearing as the Turner.

Blackberries were very abundant, and prices ranged very low, though the crop was not cut short by the drouth. Every one knows Kittatinny, but the Western Triumph, which I saw on Friend Miller's grounds for the first time, pleased me very much. The plants were set out the year before, received no cultivation, and consequently made but a small growth. But small canes, not higher than eighteen inches, were loaded with delicious berries, full as large as Kittatinny, and, as I thought better in quality. When such small canes will produce a quart of berries, I think it is worthy of general trial. I shall certainly do so.

Houghton Seedling Gooseberries were a very abundant crop, but not more than the market could consume, and sold readily at an average of 25 cents per gallon. The general impression among growers is that they are a sure and profitable crop.

CURRANTS.

But few currants came into market, all Red Dutch, and they did not sell at paying figures. As a market crop, they pay less here than any other berry, and in our dry section, need heavy mulching to produce anything like a crop. Those who want them will have to grow them themselves, and each family can do so by giving them the shady side of a fence and heavy mulching.

Recess.

SECOND DAY.

MORNING SESSION.

Meeting called to order by the President at 9:30 A. M.

The Secretary read the following essay, by William Stark, of Louisiana:

THE APPLE—WHAT VARIETIES TO PLANT, AND HOW TO CULTIVATE THE ORCHARD TO MAKE IT PROFITABLE FOR MARKET.

To President N. J. Colman, and Members of the Missouri Horticultural Society:

GENTLEMEN:—It was published in the programme of our society for this meeting, that I would write a paper on "What varieties to plant and how to care for the trees to make the market apple orchard profitable." Column upon column might be written on this subject, but I have only a little time now to give to the writing; besides, I am so very modest that I must all the time be on my guard for fear I bring myself in too abrupt conflict with the false teachings of some of our fanatical theorists who advocate the system of non-pruning, running the orchard in sod, etc., which has run the business of raising decent apples into the ground with too many in this country.

I presume you are not expecting anything more than a few short, plain suggestions—a sort of finger-board, as it were, pointing in the direction of success, as I view the situation. I shall not devote any time to the consideration of summer apples, such as are marketed in a retail way at home, or shipped only short distances; but will have reference mainly to such as are to be raised in large quantities and gathered in wholesale way and sent to any market in this country, or even in Europe, that promises the best returns. I shall not undertake to name all the varieties of good market apples; nor do I wish to be understood as conveying the idea that all of those that I do name will succeed well on all sorts of locations, or in a very wide range of latitude. My object will be more to describe the class and characteristics of the apples to raise for the general market, than to designate all of them by name.

In the first place, we should plant varieties that are reasonably hardy, and such as will bear good crops and retain the apples on the trees till they are ripe enough to gather in a wholesale way. The apples should be of fair size and good bright color. They should be of good general appearance, and the larger the better; other conditions being equal. In a word, they should be attractive to the eye. The size and appearance, in the general market, has much more to do with selling apples than the actual quality. They should have sufficient firmness to bear shipping long distances, and should be mostly good keepers, so that when the market is glutted, you may have something that you can hold over a few weeks or months, or ship to some far-off market. Some sorts may be deficient in some of these requisites and possess others in a high degree. For instance: Rawle's Janet is not large, yet it is a great bearer and holds its fruit remarkably well, ships well, and is of good quality when properly grown on good soil, with good cultivation.

The following list embraces some of the best and most profitable market apples for this latitude: Ben Davis, Rawle's Janet, Rome Beauty, Smith's Cider and Missouri Pippin, to which might be added, Winesap, Willow Twig, Lawver and Clayton. Perhaps somebody will want to know why I have not included in this list some of the yellow apples. If so, my answer is, I know of none that are as profitable as several of the red sorts. The Ortley, White Winter Pearmain and Newtown Pippin are all good and smooth, when we get them well matured; but they have too many faults to fill the requirements of a paying market orchard. If such an orchard has room for any of the yellow apples, it is perhaps the Huntman's Favorite. Jonathan is an apple of fair size, fine quality, and one of the most beautiful apples we have, but it will not fill the barrels fast enough. When we have a good crop of them, before they are ripe enough to gather, half of them have fallen to the ground. Stark is a splendid tree, a good apple of fine size, but it lacks a little in color, and does not hang to the tree long enough for a late shipping sort. Northern Spy and King are both large, well colored and of good quality, but will not prove productive enough to be classed as profitable in this section. McAfee's Nonsuch has good size, fair quality and appearance, but it is too subject to scab to risk in a market orchard.

Very many orchards planted for market have been greatly reduced in value by the use of too many sorts—and sorts entirely unsuited to the locality where planted. Many of them are perhaps good family apples, and some of them good market sorts in other sections of the country. One of my neighbors who had planted a large orchard of several dozen varieties, and largely of such as we read about in the horticultural papers at the four points of the compass, and in the catalogues of nurserymen, who have their special pets to push, has now for several years been reaping the evil effects of his indiscretion or want of experience in this latitude. He says he has come to the conclusion that Ben Davis, Rawle's Janet and Rome Beauty are the three most profitable market apples he knows.

In about this latitude, in Indiana, the Clayton is thought by some to be the most profitable market sort they have; but in Missouri it has not yet, I believe, been so thoroughly tested, but it is a good, long-lived tree, and will doubtless do well here.

Having said this much about varieties, we are now ready to gather up the trees for planting. Now is the time, when you have made up your minds what you want, to be very certain that you get the true varieties. A blunder in this can never be remedied without a serious loss of time or money, or both. If you do not know the varieties by their appearance, never buy from a party who is not well known and above suspicion. Never buy sorts you do not want because the trees look nice, or because the nurseryman, being overstocked with this, that or the other sort, offers them to you at a reduced price. Such sorts might be all right in a family orchard, but all wrong in your market orchard. It would be far better to pay two, three—yes, half a dozen—prices for the most valuable varieties, than to take and plant very many sorts that are hawked over the country, at nothing. I have known parties to plant the wrong sorts, and did not know what they had till the trees came into bearing; and then, when their trees ought to have been worth $5 to $10 apiece, they went into the orchard and grubbed them out. And I have known parties to do worse than this—leave such trees to cumber the ground to the end of their natural lives.

Select for the orchard the most suitable piece of land at your command, regardless of the fact that it would be valuable for other purposes. Avoid very poor land as far as practicable, and always avoid very wet land. Comparatively rough land will often make a valuable orchard, but on such locations it requires more labor to take care of the trees, and to keep the land up to a requisite point of productiveness to insure large crops of good apples. Plant your trees with much care, so that all of them will grow; whenever any trees are lost, replant. Some varieties may be planted from twenty to twenty-four feet, while others, on strong soils, may be allowed thirty—but twenty-five is about right for the average orchard. Give your trees good cultivation, especially while young—and even when old. I believe they should not be allowed to go long at a time without cultivation. Of course, if the land is good, it may be sowed in clover, and pastured with some sort of stock that will not injure the trees. But I believe that the orchard should not be thus treated more than two or three years at any one time; and whether in cultivation or clover, if the land is not rich enough, it should be manured from time to time—enough to keep the trees in a strong, healthy condition of growth. I do not approve of sowing small grain in the orchard, especially wheat or rye sown in the fall. Oats may sometimes be sown in the orchard after it is well grown up, and pastured down with hogs, with but little if any bad effect; but at other times this plan seems to work the orchard an injury. I would never, under any circumstances whatever, allow timothy, red-top, blue grass or any other grass in an orchard that would form a tough sod. When the orchard is not in cultivation, it should be in clover, and kept pretty closely pastured with hogs, if practicable. Sheep may be used sometimes without injury, when the trees are well up out of their reach, and horses may often be safely pastured in the orchard in early spring or when there are no apples; but cattle should never be allowed to enter the orchard. The very best treatment an orchard could have would be good cultivation, and no crops taken off the land. But if you raise a crop of corn, "hog it down," and the land will not be very much the worse for the crop. But where crops are raised and taken off, care must be taken that the soil is not too much impoverished to keep the trees sufficiently thrifty, whether before or after they are of bearing size. If the trees are not growing rapidly enough, then the land must have some stimulant—lime, ashes or other manure.

An orchard once badly stunted seldom, if ever, entirely recovers; and even if it should, there has been a loss in time that cannot be replaced. An orchard should receive its cultivation as early in the season as practicable, so that the growth of the trees can be made early in the season and have time to ripen up thoroughly and be ready for our hard winters, which sometimes come when they are unprepared to stand the extreme cold, as in the case of 1872-3, which followed a very wet July and August, which caused the trees to grow late and prevented their ripening up properly. Very many middle-aged and older trees will never entirely get over the bad effects of that winter, when the thermometer touched forty degrees below zero, for the first and the last time since this section of the country was settled. Younger trees recover from these severe winters much more readily. When it becomes necessary to manure trees, the material used should be scattered over the land at least as far from the trees as the roots extend.

A little pruning at the right time is required on almost every tree, but the operator should know why he prunes, in order to know where and how to do the work. In pruning the tops of trees while yet young, all sharp forks should be destroyed by cutting out the limb that can best be spared, and whenever two prominent limbs start out from the main stem so close together that their future growth would eventually cause them to clash, one of them should, of course, be cut out while small. Some varieties grow in such a manner that many of the leading branches require shortening back to make the tree grow sufficiently stocky. Others require only some of the longer branches to be cropped in order to keep the tree in a comely shape. Just enough should be done to make the wood grow where you want it, and to prevent its growing where you don't want it. If this light pruning is properly done while the trees are comparatively small, they will need but little when they get older. "As the twig is bent, the tree is inclined." Some varieties, of course, need much more cropping, pinching and thinning than others, but they should have careful attention while small, so that it will never become necessary to cut off large branches when they get older. To avoid cutting off large branches, or have your trees and fruit down on the ground, after bearing a few heavy crops, you must start your branches a little higher than has been the practice with many within the last twenty years. Men are ever prone to run to extremes. Forty and fifty years ago nearly all the trees were made to branch very high, and during the last twenty or twenty five years the inclination has been strong toward the other extreme. From two and a half to four and a half feet—say, mostly from three to four feet—I think is about the best height to branch apple trees, as a rule. All water sprouts should be kept rubbed off from time to time while yet small, and all suckers putting up from the roots should be kept cut off while young and tender. I have but little patience with those impracticable and fanatical theorists who declaim against any and all pruning, for even the most extreme of these theoretical visionaries will practice it themselves. They can point out to you (and so can a practical orchardist) the bad effects of too much pruning, botched work done at an improper time of the year, and all that; but this is no more a good argument against correct pruning, done by sensible, practical orchardists, than to point out the botched work of some poor pretense of a surgeon would be an argument against all surgery, even the necessary work so often performed by the skillful surgeon.

Of course the orchardist must keep a sharp look-out for rabbits, field mice, borers and other pests that are liable to invade the orchard and damage or ruin the trees. When the young orchard is growing thriftily, some parties become impatient waiting for apples. But just hold on! They are only getting ready to do more for you after a while. They are developing large limbs, large trunks and long roots and strong constitutions, in order to stand the wear and tear of the hard times coming. Don't resort to root pruning, except in very extreme cases, or you will ruin the future value of your trees. Of course cutting off all the long roots, and many other kinds of misusage, will hurry trees into earlier bearing, but too often the apples obtained in this way prove too costly in the end. In most cases where there seems to be too much inclination to make wood growth after the trees are large enough to go to bearing, it will be found sufficient treatment to slacken the cultivation in a reasonable degree, when fruitfulness usually follows, if you have been fortunate enough to plant the proper varieties in the beginning. But if you have planted Northern Spy and Yellow Bellflower, and some others of like habits, you should console yourself with the fact that you are working mainly for the next generation, when you are cultivating such varieties. All of which is respectfully submitted.

Mr. Husmann: I do not think the list of varieties large enough, and I would strike off the Janet, which is excellent for home use, but fails to bring a good price in the market. I think very highly of Huntsman's Favorite for market. I have seen them growing in more than a hundred orchards, and know of no more profitable apple. The fruit is usually very perfect, and commands a high price. It is one of the best shipping sorts—is firm fleshed, attractive in its appearance, very fragrant, and will always sell at the top of the market. The White Pippin of Ohio is a valuable yellow variety; it looks very much like the Newtown Pippin; is a strong, early and abundant bearer. Mr. Stark does not give the Jonathan its due. He says it drops from the tree, but thats because he does not gather it soon enough; it should be gathered two or three weeks earlier than Janet and most other winter varieties.

Lansingborg deserves a passing notice: it is a good grower, good bearer and good keeper. The fruit looks well when other varieties are all gone. What I have said about the Jonathan applies as well to the Fameuse, an excellent early winter variety. I would like to hear something about Grimes' Golden and Great Western—the latter an Iowa variety, said to be very large, a good bearer and a late keeper.

Mr. Ragan: Grimes' Golden is an early and abundant bearer, and is good for shipping. I think it one of our best yellow apples.

Mr. Husmann: That is my impression in regard to it, and I think that in the West it will eventually take the place of the Yellow Bellflower.

President Colman: If you were to plant an orchard of a thousand trees *for market only*, what varieties would you plant?

Mr. Husmann: Ben Davis and Huntsman's Favorite, principally. I would also plant a good many Jonathan and some Grimes' Golden, and White Pippin, and a few Lansingburg for late keepers. I would also plant the trees thirty feet apart, and put pear, peach or cherry trees between them.

Mr. Rommel: I would like to hear about the Dominie.

Mr. Evans: I think a great deal of the Jonathan. I lost heavily last fall by not having them for sale for $1.50 per bushel, when other apples were selling for $1.00 or less. The only objection to it is that it is not a good keeper. The Fameuse I do not like so well. If it is gathered early, it is not colored well, and if left until well colored, it drops badly. It does not give its full color until thoroughly ripe. If I were to plant one thousand or two thousand trees for market purposes only, I would plant Ben. Davis only.

President Colman: When will a Ben. Davis tree begin bearing?

Mr. Evans: From an orchard of that variety, five years from planting I have sold the fruit for $5.75 per tree, but that was an exceptional case. I think we can depend on trees of that age averaging $2.50 per tree. The yield constantly increases, and never fails entirely. My Ben. Davis trees gave me half a crop last year when almost all other varieties were an utter failure. Trees ten years old will average ten bushels of apples each, though the yield will, of course, vary with the location and management of the orchard. I plant one hundred trees to the acre.

Mr. Murtfeldt: In 1877, from trees eight years planted, I gathered two barrels each. The fruit was very evenly distributed over the trees. I have grown the Dominie. It is of good quality, but is liable to speck, and I would not recommend it for culture here.

Gen. Minor: I have abandoned the Rambo. It is such an irregular bearer. McAfee is excellent with me. A St. Louis commission merchant tells me that the King is the best apple he sells, but it is certainly a very inferior sort here.

Mr. Husmann: The King is very large and showy, but is only a fall variety, and is not valuable here.

Mr. Murtfeldt: If any variety is allowed to bear freely one year, does it not, in a great measure, prevent a full crop the next year? And if we leave only the proper amount of fruit on the tree, will not that have a tendency to make the tree bear regulary?

President Colman: Yes; there is no doubt of it.

Mr. Ragan: I think the essay an excellent one, especially that part of it which refers to pruning. I differ from Mr. Husmann concerning the Janet; it overbears, exhausts itself, and so bears only on alternate years, which is the reason it has become so unpopular, and been discarded by so many. Overbearing can be remedied by thinning, a matter about which we are altogether too careless. The work of thinning *pays*, and should never be neglected. In one of the best market orchards with which I am acquainted, and containing about ten thousand trees, the varieties are Ben. Davis, Janet, Huntsman's Favorite, Grimes' Golden, Missouri Pippin, Rome Beauty, Smith's Cider, Winesap, Crawford Pippin and Willow Twig. I know quite a number of market orchards in which Janet is largely grown and well liked. Huntsman's Favorite is a good variety; it bears well and sells well. Grimes' Golden is also good. I do not believe in cutting the list of market varieties down to so few varieties as are favored by my friends, Husmann and Evans. We are in danger of running to an extreme in that direction. My customers want apples all the year—summer and fall, as well as in the winter and spring. Of course, the largest part of the orchard should be of the leading winter sorts, but we must have some others too. The Standard is a good variety with me. I would also plant Northern Spy, although it is so long in coming into bearing. It is excellent when it does bear, and others will get the benefit of our planting if we do not, as it is a long-lived tree. Ben. Davis is too short-lived. For a market orchard, I would plant Early Harvest, Early Pennock, Red Astrachan, Maiden's Blush, Rambo, Mother, Grimes' Golden, Northern Spy, White Pippin, Ben. Davis, Clayton, Standard, Janet and Huntsman's Favorite. I would also plant some others for family use.

President Colman: Do you know the Alexander?

Mr. Ragan: Yes, it is a very large, showy apple, and a few trees may be profitable, but the quality of the fruit is very inferior.

President Colman: I know one man who has an orchard near St. Louis, containing a thousand trees, of which one hundred are Alexander, and the Alexander trees are more profitable than all of the remainder of the orchard.

Mr. Husmann: Do you know the Lowell? It is and excellent variety with me, and bore well last year when most other sorts failed.

Mr. Ragan: I do not know the variety.

Mr. Husmann: Do you not think that a contrast in color, as between Jonathan and Grimes' Golden, will assist in selling both varieties?

Mr. Ragan: It is undoubtedly an advantage to both varieties. I always sell my fruit in that way, when possible.

Gen. Minor: What do you mean by "thinning?"

Mr. Ragan: Boys can do the work with step-ladders. Begin work as soon as convenient after the fruit is set, and where the fruit hangs in clusters pick off enough so as to leave only one in a place. The work should be completed by the time the fruit is one-third grown.

Gen. Minor: What crops do you grow in your orchard?

Mr. Ragan: Corn is the general favorite, but I prefer some root or vine crop as being less exhaustive. We must keep up the fertility of the soil if we want good crops of fruit, and if corn is grown in the orchard it should be "hogged down."

Mr. Monaghan: Is it not true that the Janet usually brings from forty to sixty per cent. less in the market than do superior varieties?

Mr. Ragan: The Janet does very often, perhaps usually, sell for a lower price than most others, but this is because it will hang on the tree very late, and is usually shipped without care in assorting and in poor condition.

Mr. Rommel: There are two very distinct varieties of the Janet, one of them conical in form, the other rather flat. The conical variety is much the best.

Mr. Husmann: Janet varies greatly with different soils. On low lands it grows large and green, while on high ground it is smaller and redder.

Mr. Rommel: I have the two varieties growing side by side in my orchard.

Prof. Riley: The difference in the two varieties may be the result of the trees being from cions which were grown on different soils. All plants vary with location, and in some cases this variation becomes very conspicuous.

Mr. Monoghan: It seems to me that Mr. Evans' figures are altogether too large. He makes an average crop of apples worth $1,500 per acre.

Mr. Evans: I stated facts as I have found them in my own orchard.

Mr. Monoghan: Then apples at five cents per bushel are worth more than wheat at one dollar.

Mr. J. C. Evans, of Harlem, Clay Co., then read the following essay on

THE APPLE:

The time was, and many yet live who can remember it, that when an apple tree was planted, and even half cared for, success was almost certain. Then fruit-growing was a hap-hazzard. Now, it is a business. It is no longer safe to plant an orchard and expect remunerative crops of fruit without care, knowledge or labor, as formerly, but he who would succeed, must make up his mind that fruit-growing is a business of itself, and that he must study his subject well. Soil, sub-soil, location and exposure are all important.

The difference between now and former times is owing mostly, perhaps, to climatic changes consequent upon clearing the native forests and by the increase of insects resulting from permitting the birds to be destroyed by every new comer big enough to carry a shotgun.

Almost any exposure (other conditions being favorable) will do, but a Northwest slope, is considered best in my section of the State. The soil should be a light, sandy loam, or what our geologists term "marl," with a deep, open subsoil; avoid a deep black soil, if possible, as your tree will not be so long-lived; will not bear so early, nor will the fruit be of so good quality. The land should be well drained, either naturally or otherwise, as the tree *will not* endure wet feet. The above conditions being present, prepare the land by ploughing deep and harrowing well, then select your trees yourself, if possible, from the nearest reliable nursery, and take none but first-class. Two-year-olds are preferable, but three-year-old trees will do very well, if properly dug and handled. Plant a very little deeper than they grew in the nursery, in straight rows twenty to twenty-five feet apart each way.

In prairies, where strong winds prevail, close planting succeeds best.

Trees should be started with a moderately low head and gradually raised by cutting away the lower branches each year until they are three years planted, when the first limbs should be at least five feet from the ground. After this, prune only enough to keep the tree in good shape, and keep out all cross and straggling branches. Cultivate the land in corn from the start until the trees are large enough to shade most of the ground, then plough early in spring and late in the fall, and in early summer, if desirable, to keep down weeds. This will keep the trees in a good, healthy growing condition, and have a great tendency to keep the orchard free from noxious insects. The round-headed or crown borer must be looked after at all times; he is readily detected by his chips just at the surface of the ground; cut him out and draw the earth up to cover the wound. Mice are sometimes very destructive to an orchard, but if hogs are allowed to run in until late in the fall, and then the land well ploughed, they will be scarce.

A great deal has been said in favor of clover and other grasses in the orchard, but experience has taught that the land must be plowed at least once each year to insure health and vigor to the trees and keep down noxious insects. These are questions, however, that are still being discussed by all horticultural societies, but the more they they are discussed, the more we are disposed to abandon the haphazard, none-culture system and take hold of this as a business.

When we come to varieties we find no two persons who exactly agree, and this is easily accounted for when we know that with a very few exceptions all varieties behave differently under different conditions. For, instance, the Willow Twig, on a dry, light or gravelly soil is a grand success; when on a deep, black damp soil it is a total failure. Exactly the same may be said of the Yellow Bellflower. The Northern Spy will bear several years earlier on a dry light soil than on a deep black soil. The Ben Davis and Janet have done well under any and all conditions. So when we get ready to plant an orchard, we must know our soil, locations, etc., and then select such varieties as are adapted. In selecting a list for family use, care should be taken to have a succession of fruit from the earliest to the latest, and in order to be more certain of this it is well to take more than one variety of the same season. The Early Harvest stands at the head of the list of earlies, and is giving good satisfaction both as an apple and as a bearer. It should be in every family orchard. Carolina June fills the same season, and is a handsome, small apple, of good quality.

Red Astrachan also comes in the same season, and is an extra good grower and bearer. American Summer Pearmain is one of the very best coming next in season. Fruit of the best quality, ripens gradually up to the first or the middle of September. The tree makes a fine, strong hardy orchard tree, but is a scraggy, slow grower in the nursery, and most nurserymen have quit growing it on that account. Porter fills about the same season, is a handsome yellow apple of very good quality, rather a slow grower at first, but makes a good orchard tree. Maiden Blush is a yellow apple, with usually a blush on the sun side, is of good size, and the best quality, filling a long season; tree a strong hardy grower, and one of the best bearers. Early Strawberry is a beautiful, small, red striped apple of the best quality, one of the nicest table apples; tree, an upright good grower, but slow coming into bearing.

Mother, a red apple of good size and best quality, tree, a strong, hardy upright grower and good bearer. Pa, Red Streak, above medium in size, of fair quality, and when well handled will keep well into winter; the tree is a good grower, but rather tender in the wood, like Rambo. The fruit is also similar to Rambo, but larger.

Jonathan, one of the very best early winter, keeps till near midwinter; the tree is small in the nursery, but makes a good orchard tree and is hardy. The old Milam is another good apple for early as well as late winter, and is so well suited to all purposes and so reliable, that no family orchard is complete without it. As a family apple, the old reliable Janet should not be left out. Rome Beauty is a handsome apple of good quality, and bears well, tree, a hardy upright grower. Huntsman's Favorite is a long keeper, of the best quality, and bids fair to do well here in its native home, the tree is also an upright good grower, and is hardy.

The above list is in the order in which the varieties ripen, and will give a succession of fruit from July until May. To recapitulate we have

Early Summer—Early Harvest, Red June, Red Astrachan;

Late Summer—American S. Permain, Maiden Blush, Early Strawberry;

Early Winter—Jonathan, Milam, Mother, Pa Red Streak;

Winter—Janet, Rome Beauty, Huntsman's Favorite.

This list is intended for family use only, but by the addition of Ben Davis, we have a very good list for a local market.

If every farm in the State, at all adapted to the apple, had such a list growing on the best location, and well-cared for, there would be less sickness in our land, our doctor's bills would be less, the cost of living would be less, to say nothing of the real comfort and enjoyment; indeed, such blessings tend to give real happiness.

In planting an orchard, especially for a local market, the above list would be improved by taking from it Milam, and adding Yellow Belleflower, where the land is suitable.

For a large commercial orchard, a few good winter varieties have paid better than a general assortment, because you have a long season in which to market them, and if you have early apples they must be marketed at once, or they are lost; besides, you often find the markets full of other fruits, and your apples go begging.

As a commercial apple, the Ben Davis now stands at the head of the list. The tree is a hardy, vigorous grower, and one of the best bearers. The fruit has commanded more per barrel this season in all our Western markets than any other apple.

Willow Twig, under favorable conditions, is a good commercial apple. It is an apple of fine size and good color, and sells well; the tree is hardy.

Smith's Cider is doing well in eastern Missouri and Illinois, but further west it is somewhat subject to blight. The size and color of the fruit makes it sell well.

Jonathan is one of the best market apples for early winter, of fair size and beautiful color.

Huntsman's Favorite bids fair to become a leading commercial apple. It is a long keeper, a rich yellow color, with sometimes a bronze cheek.

Lawver is a long-keeper, of fine size and appearance, and ships well, but has not been sufficiently tested, except on its native soil.

Winesap is one of our leading sorts, a good keeper and a splendid shipper; is poorly rooted, and hard to get established in the orchard.

There are many other good and desirable sorts, well suited to a commercial orchard, but enough have been named, as too many varieties are not desirable.

Our object in planting a commercial orchard is to make money out of it, and if we have a few of the very best varieties, we have enough.

We have now Ben Davis, Willow Twig, Smith's Cider, Jonathan, Huntsman's Favorite, Lawver and Winesap.

A long chapter might be written on picking, packing and marketing, but a few hints must here suffice.

The time to begin to pick is always fixed by circumstances, and every one must be his own judge. The extent of the crop and the amount of help will of course govern somewhat.

Provide good new barrels, and when you are ready to begin packing take them to the tree, pick the apples carefully by hand, when perfectly dry, place a layer in the bottom of the barrel, then fill up, shaking gently to settle until full or a little more so, the head will press in and tighten the fruit; put in none but perfect specimens, put your barrels when filled into an out-building or shed until danger of freezing, then take to the cellar.

Prof. Tracy: Why does Mr. Evans exclude all sweet apples from the list? He does not admit them even for family use.

Mr. Evans: There is no sweet apple which is profitable for market. For family use, Golden Sweet is the best for early—better than Sweet Bough. Sweet Romanite is good for winter use. In the East, Winter Sweet Paradise is good, but it does not succeed so well here in the West.

President Colman: I have found Sweet June one of the best.

Mr. Husmann: Sweet June is good with me; it bears well, keeps well, and has a very fine flavor when in season. Fameuse will answer for a sweet apple when fully ripe.

Mr. Ragan: Green Sweet and Ladies Sweet are excellent, but Sweet Janet, a seedling of Rawles' Janet, is the best sweet apple that I know.

President Colman: Farmers need to be educated to plant sweet apples. They are grown largely in the Eastern States for stock food, and are cheaper and better than corn for that use.

Mr. Murtfeldt: I have a good crop of sweet apples every year, and use a great many in my family, but can find no market for the surplus. Sweet Bough is best with me, but local influences exist everywhere, and we must consult our neighbors and make our selection of varieties accordingly.

Mr. Husmann: In his essay, Mr. Evans said that trees planted on low grounds are short lived. I differ from him on that point, as I know of many old and healthy orchards on the Missouri river bottoms, and I know many successful fruit growers who recommend low lands for long lived orchards. In speaking of varieties, Pryor's Red has not been mentioned. This is a mistake, as it is a good bearer and of good quality.

Recess.

AFTERNOON SESSION.

The afternoon session of the second day of the meeting, being the regular time for the election of officers for the ensuing year, the Society proceeded to ballot with the following result:

President, N. J. Colman, St. Louis; Vice Presidents, first district, Henry Michel, St. Louis; second district, Henry T. Mudd, St. Louis; third district, Jacob Rhodes, Bridgeton; fourth district, H. D. Wilson, Cape Girardeau; fifth district, W. S. Jewett, Crystal City;

sixth district, M. S. Rountree, Springfield; seventh district, Geo. Husmann, Sedalia; eighth district, Maj. Z. S. Ragan, Independence; ninth district, Jacob Madinger, St. Joseph; tenth district, W. H. Miller, Chillicothe; eleventh district, S. M. Tracy, Columbia; twelfth district, J. Hawkins, Hannibal; thirteenth district, Wm. Stark, Louisiana; Secretary, S. M. Tracy, Columbia; Treasurer, G. C. Swallow, Columbia.

The following communication was then read:

To the Missouri Horticultural Society:

GENTLEMEN: Through the kindness of your president, I herewith present you a description and colored plate of the Gov. Garland, a new peach which I am introducing, and that you may sooner be able to judge of its merits for yourselves, I make the following proposition:

If you will select a committee of three or more of your members, living in different portions of your State where peaches are successful, to test the Gov. Garland, by the side of other new *early* varieties, and report the results to your society, I will ship to each of said committee, from Normal, Ill., ten (10) or more Gov. Garland *in bud*, provided no buds from said trees be used for commercial purposes without my permission.

Should the above proposition be accepted, you will please send me the address of each of the committee, as soon as convenient.

JNO. B. GILL.

Bentonville, Ark., Jan. 18, 1879.

The offer was accepted with a vote of thanks, and Wm. Stark of Louisiana, Geo. Husmann of Sedalia, J. C. Evans of Harlem and Z. S. Ragan of Independence, were appointed a committee to receive and test the trees.

Maj. Z. S. Ragan presented the following

REPORT FROM THE EIGHTH DISTRICT:

Mr. President and Members of the Missouri State Horticultural Society:

In compliance with a request of the President, and a former custom of Vice-Presidents of the different districts of the State, to send in some report, allow me to submit my humble contribution.

The past year, or rather, the winter of 1877-8, was unusually mild and favorable on fruit buds and trees, and at the same time to the hibernation of many insects that infest and damage our fruits. Yet, with all drawbacks and failures, we still had a feast of good fruits during the year just closed.

Strawberries came first in order, and while many consider our soil too loose and light for the strawberry, I have observed that those who take the necessary pains to plant the best kinds on properly prepared grounds, and give the necessary care and attention, succeed in raising fine fruits, and make the business pay; which shows that it is a want of knowledge and proper care on the part of most that fail. The varieties mostly cultivated with me are Early Scarlet, (very prolific and good, but too small and soft for market) Wilson's Albany, Kentucky, Green Prolific, Cumberland and Captain Jack. The two latter were ery fine indeed last spring.

Gooseberries—Bore but little. I have the Houghton and Mountain Seedling.

Currants—Bore but little, except where they received special attention. They do best on the north of fences, or where partially shaded by trees or shrubbery. If planted in open ground, and well manured and thoroughly cultivated before the warm season sets in, and then mulched with some green grass or weeds, they seldom fail to bear a good crop of fine fruit. Those with whom I am acquainted, that have pursued this mode of cultivation, say that they pay as well as any other crop.

Cherries—Abundant crop and fruit very fine. Commenced ripening unusually early. Early Purple Guigne commenced ripening the latter part of April, and I sent to the Journal office, Kansas City, a box of the fruit on the first day of May, of which favorable mention was made, and the question asked if any one ever knew ripe cherries grown in this vicinity so early.

I had in bearing Early Purple Guigne, May Duke, Early May or Richmond, Black Tartarian, Governor Wood, Yellow Spanish, Belle Magnifique, Reine Hortense, Downer, English Morello, Late Kentish, and some other kinds. I shipped cherries the past season into six different States, and nearly all reached their destination in good order, and afforded satisfactory returns.

Raspberries and Blackberries—Both bore fine crops, following in quick succession after strawberries and cherries, keeping up a supply till peaches and apples came in, thus affording daily shipments till frost. The summer was one of unusual and protracted heat, with the mercury much of the time 90 to 100 degrees in the shade, which made it unfavorable for shipping, especially for long distances, hence our fruit did not get to market in quite so good condition, and money being scarce, we did not realize quite so much as the year before. Still, our returns were as good as could be expected, and probably paid as well as any other industry.

Peaches bloomed very profusely, and set on an over crop, but having matured a full crop the year before, it was not reasonable to expect too much of them, unless the tedious and costly method of thinning the fruit was attended to. Yet the mild winter favored the hibernation of more than usual numbers of injurious insects, which commenced on the fruit by the time the bloom dropped, and these, together with the excessive warm weather, caused a portion to either rot or drop prematurely, so as to leave no more than was necessary for a good crop.

We had the following kinds in bearing, besides many others to come in sôon, to-wit: Amsden, Early Beatrice, Alexander, Early Louise, Hale's Early, Troth's Early Red, Early Rivers, Large Early York, Early Crawford, Golden Empire, Evans, Lagrange, Old Mixon Free, Early Newington, Late Crawford, Smock's Free, Newington Cling, Heath Cling, Washington, Ward's Late, Prince's Late and Salway. Amsden and Early Beatrice were the first to ripen. Picked some of each of them on the 12th of June and on the 20th, these together with Alexander were ripe enough to send to Kansas City in baskets. July 2d, we made our first shipment of Hale's Early, thence a succession something after the order named, kept up daily shipments till frost.

We have some newly originated kinds that bid fair for favor:

Amsden—Origin southwest part of our State, and is giving good satisfaction, wherever tested, as one of the very earliest to commence ripening, yet continues about two weeks.

Wyandotte Chief—Originated ten miles west of my place, in the town of Wyandotte, Kansas. A specimen sent me through the mail on the 19th day of June last, measured 8½ inches in circumference. It was beautiful marbled red and white; flesh firm, especially so for so early a peach. Quality good. Free. I consider it one of the handsomest and largest very early peaches that it has been my fortune to meet with. From the best I can learn it is from seed of the Hale.

The Evans originated in this neighborhood and is decended from Heath Cling; a cling, very large and handsome, and ripens about the last of August. Quality very good, specimens measured 11 inches in circumference.

Steadley—A very late peach, originated at Bluffton, and is highly recommended by our distinguished pomologists, Messrs. Husmann and Miller. I have grown two new seedlings from seeds of Smock's Free. One a cling, bright yellow with beautiful blush of red on a peculiarly fine velvetty skin, very handsome and good. About the size of its parent, and ripens one week later. The other Free, dull yellow, a little larger than Smock, and ripens one week later than Smock, and a few days before Salway.

Aikin's November—From seed of Heath Cling. Originated in Indepence, in the garden of Mr. Wylie Aikin. Fruit large, yet not quite as large as Heath Cling. White, with delicate blush of red. Flesh firm very fair, barely separating from the seed, yet enough to be called a free stone. It ripened later than any other peach on our list last fall, and I kept some several weeks after being gathered. It is decidedly the latest peach I have seen, possessing the good qualities which it does, and in addition to the fact that it is an excellent shipper, it will extend the time and succession of our market list.

The foregoing may not include all our good shipping and market kinds. Yet to these may be added to or substituted, to complete an amateur or market list to suit the fancy of those wishing to plant. By a judicious selection of the many valuable kinds now in cultivation, we are enabled to prolong the season of this valuable luxury far beyond what it was half a century ago. So much for the science of Horticulture!

Pears—As a general thing did not bear a crop, yet some orchards were full, and others had more or less on certain kinds. It is a source of regret and extreme perplexity that the trees which bear this very valuable fruit, are so subject to blight, and that the cause of this fatal malady cannot be definitely settled among our knowing pomologists. The pear being my favorite fruit, has induced me to devote much time and labor to its cultivation. I am still making it a specialty in connection with a commercial orchard. From the fact of having planted a small pear orchard in Indiana about thirty-five years ago, which escaped blight and proved profitable, I was induced, in coming to this State ten years ago, to plant over one thousand trees. Although, up to the present time, I cannot claim exemption from blight, especially certain kinds, still, my loss has been very small compared with that of many others who planted trees at the same time. Pear trees (standard) send their roots deep into the earth, and require dry land, either well under-drained, but natural drainage always preferred.

Cultivation—Dwarfs should have deep and thorough cultivation, and liberal manuring to enable the fine fibrous roots of the quince to penetrate in search of food to supply the growth of both wood and fruit.

Standard trees are better calculated to bear neglect, since they make strong roots that extend both downward and latterally to a great distance. Yet they, too, should have good cultivation, for at least five or six years, and, by all means, the cultivation should be early in the season, so they may mature their wood before winter. If, however, from any cause whatever, the trees should be induced to make late growth of unripened wood or tender water-sprouts, all such unripened wood should be cut off before winter sets in. If left on, and a severe winter should follow, blight may be expected the next summer.

After five or six years' cultivation, the orchard may be put in clover, and if mowed, a portion of the grass may be put around each tree, which serves as a mulch during the warm season and acts as a fertilizer. If pastured, should be by light stock—such as calves, pigs or sheep. If needed to keep up a good healthy growth in the trees, some trashy litter, such as scrapings from the barn-yard, chip pile or ashes, should be scattered broadcast over the ground, but avoid strong, heating or stimulating manures. I might here give my views on the subject of blight, but as I am already making this report too lengthy, must omit that controverted subject for the present, but suggest the importance of cutting back all blighted branches to sound wood as soon as it makes its appearance.

The varieties that I cultivate are mainly as follows: Dwarfs, Duchesse, Beurre Superfin, Louise Bonne D'Jersey, Seckel, Beurre D'Anjou and Clapp's Favorite.

Standards—Early Madeleine, Bloodgood, Twyson, Clapp's Favorite, Bartlett, Beurre Superfin, Flemish Beauty, Seckel, Sheldon, Fall Butter, Edmonds, Lawrence, Vicar of Winkfield and Winter Nelis.

I am only able to note one seedling pear, recently brought to notice by my friend A. M. Anderson, an intelligent and enthusiastic horticulturalist of Springfield, Missouri. The tree originated in the southwest corner of the State, in Barry county. The tree is said to be about forty years old, and is both healthy and productive. Fruit large—nearly as large as the Duchesse, and of fine quality, and keeps well. It has been christened Missouri Queen. We have long felt the need of a No. 1 late pear, and if this comes up to representation, it will doubtless be a valuable acquisition to our list of fine pears. Up to the present I have not had a general crop on my trees, yet certain trees and certain kinds have borne more or less. The trees are looking finely, and have set a good crop of bloom buds for next year, and that being the tenth summer after planting, if no disaster, may expect a crop.

Apples—As might be expected, bore but a scanty crop, except some early varieties did well and some of the late kinds that did not bear heavily the year before, had more or less fruit, but generally of an inferior quality.

We had abundance of early apples for home consumption, and a goodly amount for shipment. Yet for good keepers we have to look elsewhere for a large portion of our consumption. While the fall before we were pressed to procure cooperage and railroad transportation to send out the great surplus of apples in Western Missouri.

While we have been a little short of apples the past year, other fruits have been abundant in their season, and all things considered, we have great reasons to be thankful.

Z. S. RAGAN.

INDEPENDENCE, Mo., January, 1879.

Prof. C. V. Riley, Entomologist for the United States Department of Agriculture, and former State Entomologist of Missouri, then read the following entomological notes:

NOTES ON THE APPLE-WORM.

Mr. J. Savage, of Lawrence, Kansas, in a recent number of Colman's "Rural World," remarks upon the freedom of Michigan apples from the work of the apple-worm (*Carpocapsa Pomonella.*) This same freedom has been quite generally noticed the present year, not only in Michigan, but in many parts of New York, and it doubtless obtained elsewhere. It will be well for us to endeavor to arrive at the reasons. To my mind, the following may very properly be urged: First. The very general failure of the apple crop in 1877, as exemplified in the reports for that year, which we find both in the proceedings of the Michigan Pomological Society, and in those of the American Pomological Society. This failure was in many localities so nearly total that scarcely any apples were grown, and it follows, as a consequence, that very few coddling moths were produced to perpetuate the species the following year. A second reason, so far as Michigan is concerned, may be found in the fact that in no State in the Union have more intelligent and persevering efforts been made to prevent its ravages. Through the columns of the Agricultural and Horticultural journals, as well as through the pages of their Pomological Transactions, the simple methods of fighting this pest, that have been reported and recommended in Missouri reports have been persistently kept before the people, while Prof. Beal, of the Agricultural College, has, perhaps, done more good than any one else by showing that it cost him no more than four cents per tree to keep the bands around the trunks, changing them every nine days in the warm months, from the first appearance of the worms until the end of August, in an orchard of 250 trees. I agree with him when he asserts that "if a man will not take the trouble to keep his fruit from the worms, he deserves to eat wormy apples."

Missouri apple growers should take courage from these facts. Since my connection with the Department of Agriculture, there have been sent to me, four different kinds of patent bandages to be used as traps for this apple-worm, but I can find no advantages in any of them over the simple paper bandages, first recommended by me in 1872, and since very generally employed.

NEW FACTS ABOUT THE ROUND-HEADED APPLE-TREE BORER.

This enemy is comparatively rare in most parts of Missouri, the flat-headed borer (*Chrysobothris femorata*) being far the most injurious. The former is, in fact, much more common on flat prairie loam than on hilly and more clayey soils. From observations of G. C. Brackett, of Kansas, and J. W. Robinson, of Tremont, Ills., who has had a very large experience with this insect and its eggs, I am able to give the following account, as it appeared in the N. Y. Tribune:

"The egg is pale rust-brown in color, one-eighth of an inch long, one-third as wide in the middle, flattened so as to have a depth about one-third the width. The shell is fairly tough and resisting; it is not sculptured, but is sufficiently plastic, when laid to receive impressions from the wood fibres between which it is pressed. The embryo lies straight within the shell, and the newly hatched larva differs from the full-grown larva in size alone. The female beetle makes an incision in the bark, causing it to split from one-fifth to some-times half an inch. The incision is often made entirely through the bark, and the egg is thrust between the bark and the liber, at right angles to one side of the slit, from one-eighth to one-quarter from the aperture. Sometimes the bark is but partially penetrated, in which case it is pried open to one side of the aperture for the reception of the egg. In either case the egg is accompanied by a gummy fluid, which covers and secures it to its place, and usually fills up the aperture. In young trees with tender bark, the egg is usually thoroughly hidden, while in older trees it is sometimes so shallowly embedded as to be readily seen. The horny ovipositor of the female beetle is withdrawn and invisible in repose, but may be exserted. It is broad, flattened, with a thin edge. It is probably strong and sharp enough to penetrate soft bark without any previous work of the jaws, as I can find no such indication of mandibular action in the punctures examined."

Mr. Brackett has also shown, conclusively, that the eggs may be laid as late as September, and not infrequently in the trunk and larger limbs. I have myself recorded the beetles as occurring as late as August in St. Louis, but the fact, nevertheless, remains, that in that latitude they appear most abundantly and lay most eggs in June; also that the butt of the tree is preferred and most affected by the species. This agrees with the experience of Mr. Robson, Mr. Wier of Lacon, Ill., and others. Mr. Brackett makes one deduction from his observations, with which I cannot entirely concur. He argues that washes and external applications cannot "practically be reliable against the deposit of eggs;" giving as his reason, that the eggs are so securely hidden under the bark that such washes will not reach them. Applications of soap and alkaline solutions have been recommended by entomologists, and have been found effectual when intelligently and diligently applied; not as destroying the eggs after these are laid, but as preventing the female beetle from laying, and herein lies the philosophy of their use.

Mr. Brackett further argues that the lengthened laying season—from June to September—renders the effectual protection of the tree impracticable, even if the applications do keep the beetle off; and, finally, he expresses the belief that if she be kept off the butt, the trunk and the base of the larger limbs, she will select places still higher up on the tree in which to oviposit. As a result of this kind of reasoning, he recommends to his brother nurserymen and fruit-growers that they allow the beetles "the privilege of following the instincts of their nature in selections of place, and that we depend for their destruction upon a careful examination of the trees, and prompt use of the knife and probe."

A careful man, like Mr. Brackett, may find such a course safe enough, for where the ground is kept clean and the trunks in good condition, the punctures may be readily discerned. The eggs swell somewhat before hatching, and cause the bark to bulge around the aperture. They may easily be crushed by pressure, when they crack audibly. If the larva has already hatched, the discolored spot indicates its whereabouts. A drop of moisture or the sawdust-like castings betray its presence a little later, when it has begun its destructive work. Mr. Robson says he habitually crushed and destroyed from one to ten eggs to a tree each year, on many hundreds of his trees while they were young. But while this means may answer with some persons, I would still recommend preventive washes, to be followed by the examination of the trees, and knife and probe, when found necessary. The preventive precautions reduce the subsequent work to a minimum, and prove one of the cheapest and best modes of fighting this insect, especially if one has to hire the work done. Again, it is useful against the flat-headed species, which is not so easily kept in check with knife, probe or thumb-nail. It is also far more in keeping with known facts and experience that, if driven from the trunk and butt of a particular tree by (to her) offensive applications, the female beetle will seek like situations on trees not so treated, than that she will oviposit in the branches. If all orchardists in a given neighborhood were to systematically adopt preventive measures, and if there were no wild crabs, thorns or other trees in the neighborhood in which the species could breed, the female might be driven to the branches of cultivated trees. But such a condition of things has not yet obtained, within my experience, in any part of the country, and were it to obtain, the injury to the branches would not begin to be so fatal to the tree as the girdling and boring at the butt.

Prof. Tracy. When and how do you apply washes to prevent the attacks of the apple tree borer?

Prof. Riley. Either soft or bar soap should be rubbed on the trees early in the season before the eggs are laid, and again later, about June, though I doubt if the last application if often necessary.

Prof. Tracy. That plan is one we pursue at the agricultural college. Soap is rubbed in the crotches and on the trunks of the trees early in May and again about the last of June. Later in the season the trees are thoroughly examined, and the borers, if any, are removed, but we find the soap an almost certain preventative.

Prof. Riley. The soap should be rubbed on the base of the tree, also. The southwest side of the tree should be especially watched, as the borer is most frequently found there.

The subject of peach culture was introduced by an essay from W. F. Murray, of Forbes, Holt county, as follows:

PEACH CULTURE.

To the Horticultural Society of Missouri:

Gentlemen:—Not being able to meet with you as I desire, I send, at the request of my esteemed friend, Mr. Storms, of St. Joseph, an article on peach growing, hoping that it may prove of some interest to your honorable body.

THE PEACH.

This delicious fruit, a native of Persia, has been introduced into Europe and America, and by energy and skill, its cultivation has proved a success in many sections of country where it was formerly thought it could not be grown.

Its cultivation in Europe has not proved a general success, and it is grown there now only in a few localities. The United States is the only country on the globe that grows peaches for exportation in any form.

Our home consumption of peaches would be increased four-fold by increasing the supply and reducing the prices, thus placing them within the reach of the masses of the people.

While it is true that the cultivation of the peach has been spread far and wide over our country, and while it may, with proper care, be grown to some extent throughout a much larger extent of it, yet there are vast regions of our broad domain in which it cannot be successfully grown; in fact there are only a few favored sections where it seems to be perfectly at home, and where the fruit reaches its highest perfection with the care now bestowed upon it. Among these favored sections may be mentioned portions of New Jersey, Maryland, Pennsylvania, Michigan, Illinois, Missouri and some of the Southern States. Being by birth a Virginian, and for the last twenty years a nurseryman and fruit grower by occupation, having traveled in Virginia, Maryland, Pennsylvania, Kentucky, Ohio, Indiana, Michigan, Illinois, Iowa, Kansas, Nebraska and Missouri, and thereby possessing ample opportunities at various exhibitions of fruit, and in city markets to inspect samples from New England famous orchards, and the boasted fruit gardens of the Pacific coasts, and having lived in Missouri for ten years I am now free to assert without fear of successful contradiction, that the bluffy and rolling lands of the Missouri river, extending through our State, will, when fully tested, excel for peach growing. That they will in time become the Eden of the occidental world, where every man, who will, may sit beneath his own vine and peach tree and eat of their luscious fruits, the rich reward of pleasant labor.

The best soil for peaches is a light rather dry, and moderately rich loam. The most favorable climate is steady cold in winter, hot and moderately dry summers, and dry autumn weather to thoroughly mature the wood before winter. The soil and climate here in the Missouri Valley, are as near this type as can be found any where, and we find the peach tree healthy and flourishing.

Some of my neighbors here in Holt county have peach trees still healthy and productive, which were planted by the first white settlers fifty years ago.

In our own orchard we can show trees of the late Delaware planted nine years ago. These trees are one foot in diameter, and some of them yielded last season eighteen crates of peaches, which sold for fifty-three cents per crate.

The Peach Leaf Curl is seldom seen here, and the Yellows, the terror of eastern peach growers, is a total stranger.

The Peach Tree Borer, another great annoyance to eastern growers, gives but little trouble in Missouri.

In our orchard of several thousand trees we have never paid any attention to them and they have killed very few trees for us. Other advantages which this country offers to peach growers are cheap lands, selling at from $3 to $25 per acre. This land is situated in a healthy, well watered country, where there is an abundance of native timber for boxing and where are railroads leading in every direction, giving ample facilities for shipping.

It is bounded on the north by a vast grazing and mining country, where peaches cannot be successfully grown, and which is rapidly filling up with emigrants. All these considerations go to place Missouri in the front rank as a peach growing State.

I fear that fruit growers in general are underrating the importance of the fact. Our increasing list of varieties, giving us peaches just from the orchard four months in succession, the art of canning, the improved methods of drying, the successful experiment of exporting peaches by refrigerator cars and vessels, and the constant and rapidly increasing demand for peaches, both at home and abroad, have all combined to give an impetus to peach growing never dreamed of by our fathers, who thought five hundred trees a large orchard, and twenty-five cents to a dollar a bushel, a good price.

Now, orchards containing thousands of trees are planted; the demand still increases, and prices remain high, while the prices of every thing else have fallen from twenty to twenty-five per cent.

In the spring of 1869 I planted five hundred budded trees, sixteen feet apart each way. The first three years after planting I cultivated the ground in corn and potatoes. In 1873 the orchard bore some fruit. In 1874 the fruit (not reckoning what was used for home consumption) netted $400. The winter preceding was very cold, the thermometer at one time reaching twenty-two degrees below zero. The next crop was mostly killed by a heavy sleet of ice in March. There were, however, enough buds left for one-third of a crop, which was destroyed by grasshoppers. The winter of 1875-76 was unusually warm; peaches bloomed in February, and were nearly all killed. In the summer of 1877 the five hundred trees yielded 998 crates, which were shipped to Omaha and Council Bluffs, and netted $583.96. The crop of last summer, from the same trees, was 1,780 boxes (one-third of a bushel per box), which were shipped to Omaha, Lincoln and other western markets, netting $951.10, or $1.59 per bushel.

Please bear in mind the price of other products, and tell me what will pay better than peaches.

Some may fear an over-production of peaches. I do not, so long as Missouri groceries are stocked with fruit from other States. It should be our ambition to supply our own citizens with a superior quality of peaches, and the products of our orchards should be found in various forms in all the markets of the civilized world.

Then our drooping industries would revive. Cities would spring up, commerce would ever roll her golden tide along, and Missouri, as a State, would take one grand stride toward the zenith of her glory.

In the discussion which followed the reading of the essay, Mr. Ragan said: One of the most important points in peach culture is to extend the time of ripening. We now have varieties which ripen about July 1st, and other varieties which extend the season until into October. If we can get good June and late October and November varieties, they will be of very great value to us, as the earliest and latest sorts always bring the best prices and are the most profitable.

Prof. Swallow stated that the area for profitable peach culture in Missouri is limited. Mr. Murray reported a very profitable orchard in Holt county, but his orchard is located near the Missouri river. In Columbia, ten miles from the river, peaches do not bear oftener than one year in three, while orchards on the bluffs near the river will bear two years out of three.

Mr. Ragan advocated high ground, surrounded by low ground for orchards. Formerly tree planters advocated sheltered locations for peach orchards, now they recommend high ground. His orchard is 1,900 feet above St. Louis, and 312 feet above the surrounding country. He said the fact that cold air is heavier than warm is now more generally understood; cold air will settle in the lowest places, and, consequently, so-called sheltered locations on river bottoms and in the woods were not as free from frosts as higher locations. He had secured the highest point to be found in that part of the State, and, consequently, had experienced no difficulty in raising fruits of the highest quality.

Messrs. Husmann, Evans, Monaghan, Tracy and others also took part in the discussion, at the close of which

Mr. Husmann read the following

REPORT ON PEACHES.

Peaches came in unusually early this season. Our first Amsden ripened June 13th, and came fully up to my expectations. I think it one of the few fruits which has not been overpraised. A good many specimens measured eight inches in circumference, and our crop averaged us over $5 per bushel, as they were ripe and gone before the drought set in. It is fine in color, and of decidedly better quality than Hale's Early; also ships better. The bloom is also very hardy. I find but one objection to it, and that is, its being a clingstone. I know it has been called a freestone, but it certainly is not. Alexander, just by its side, ripened a few days later and was not as large and fine, but the difference may arise from the fact that the Alexander trees were a year younger, and had but few fruits on the inside branches, while the Amsden on four year old trees, were distributed more evenly. I have no doubt that they are two distinct varieties, as the wood and leaf differ, but the fruit is so much alike that it would hardly pay to have both. My choice would be the Amsden.

Early Beatrice and Louise—Both are too small to ever have much show in our markets, and Beatrice is very insipid, while Louise is really of good quality. Early Rivers is larger, and is a very good peach, though its color is not very inviting. Still it may fill a vacancy between Amsden and Hale's Early, and as our Amsden were gone a week before Hale's ripened, we need a peach to come in between them. Hale's Early, on account of the Curculio and its natural tendency to rot during as wet weather as we had while it ripened, perfected but very little of its fruit, and is hardly to be recommended, if we had anything else ripening at the same time. Still, it is hardy and generally productive here, and I think we will have to fight the Curculio in the future if we want any nice peaches. I have never seen a season when they were as destructive as they were during this season, which is probably owing to the unusually mild winter.

Foster—This is a very fine peach indeed; ripening about the same time as Crawford's Early, but larger, handsomer, and better in quality, though belonging to the same class as Crawford's.

Among the other peaches brought to this market, I noticed especially Troth's Early, medium sized but very good; Early Tillotson, very good; Crawford's Early and Late; Old Mixon, free and cling, and Heath cling. The drought set in about the end of July and injured, especially the later crops, very much. Between the drought and Curculio our peaches were not near so good as last year. From the first of July on, the average price varied from one to two dollars per bushel for good fruit.

APRICOTS AND PLUMS.

There were more apricots in the market than formerly, and they sold at very remunerative figures, mostly at retail. Of plums, Chickasaw and Wild Goose were abundant, and the latter seems to give general satisfaction as a sure bearer of very good fruit.

President Colman said that the peach must be well cultivated and well pruned in order to bear profitable crops.

Mr. Ragan thought pruning an important matter, and favored high tops as making the tree more durable. On poor land he would cultivate his trees, but would not do so on rich land. He would cut back rather than thin the fruit.

Mr. Husmann also advocated severe pruning.

The following essay, by J. A. Storm of St. Joseph, was then read by the Secretary:

CULTIVATION AND MARKETING OF APPLES AND PEACHES.

To the President and Members of the State Horticultural Society:

By request, I will endeavor to give you my views of the most important features as regards the cultivation and marketing of fruits. Before entering on my subject I wish to preface my remarks so as to be more fully understood:

First, In order for a person to be successful in any business, he should have a taste for the same.

Second, He should fully understand it and give it the full amount of study and attention that it may require, in order to learn the wants and advantages belonging to it.

You may say that it is an easy matter to propagate fruit, as all farmers, gardners, and in fact every person who has twenty by forty feet or more of soil, propagates more or less of fruit. I will admit that they do raise more or less of the different kinds of fruit, when kind Providence does not prevent. I will ask how many out of the hundreds of thousands that grow fruits, grow them successfully. There are many points that should be considered in growing and marketing of fruits. I shall name a few of the most important:

My standpoint is upon a commercial basis, and the same rule should be applied to all cases, unless where the parties are growing for family use.

First, The selection of a site for the orchard. In order to make a proper selection, you will have to notice the surroundings. In all cases the site should be an elevated one, and sufficiently rolling so as to insure good drainage, and if a slope should be selected, a northwest slope is preferable to any other, as the most of our winds are from the northwest. The reason for selecting such an exposure is as follows: When the trees are in bloom we often have rains, then the cells of the bloom become filled with water and are more liable to freeze than when dry. The winds drive the water and frost out from the cells of the bloom, and often saves a crop. If you could select such a site near a water course, it would be preferable, as the water is liable to prevent frost quite a distance, and often saves the fruit. If such a location could be found so as to have a northern or northeast protection of timber, it would add much to the security of the crop, and be a great protection to the trees.

In making a proper selection of a site we must not lose sight of the soil best adapted for orchards, which is an important feature. Much depends upon the soil, as it controls the longevity of the trees and the keeping qualities of the fruits. Trees and fruits that are grown on rich alluvial soil are not as lasting as those grown on clay soil. All timber of rapid growth is of short life; the same rule will apply to fruits and vegetables, as a general rule..

After the location of the orchard, next will be the selection of the different varieties of fruits, which is, in my opinion, a very important feature.

First, You will have to find your market; if your market is at a great distance, then you will have to select the most hardy and best keepers, and a large majority of winter fruits. If your market is convenient you can add a few more of the early varieties. My experience has been that the extra early and late varieties are the fruits that pay best. I would not recommend more than two summer, four fall, and from six to eight winter varieties. They all would be composed of large showy varieties, and of those that had the greatest number of good qualities, such as size, color, bearing and keeping qualities.

The varieties to plant are those that are good and sure bearers, fruits large and showy. What does it matter to the grower if the fruit suits his taste or not, so that it will sell readily and bring a good price. Some of our most saleable fruits are of an inferior quality.

Now, as to the culture of the orchard, I will say but little. I would recommend a thorough pruning of all surplus wood, and a moderate cultivation of the soil, so as to keep the orchard as much in grass as possible. I should recommend that the fruits of a kind and all varieties ripening at the same time, be so arranged as to have them in rotation, so as not to interfere with the latter varieties in gathering, as much depends on the care of fruits.

After hurrying over the location, culture and varieties of fruits, I will endeavor to speak of one of the most important points of this subject, and that is on the gathering and marketing of fruits. According to an old-saying there is a proper time to do all things, and if it is worth doing, it will pay to do it well. As all fruits do not ripen at the same time, they should be gathered when they are sufficiently ripe so as to insure the greatest lasting qualities; some gather their fruits before they are sufficiently ripe, others will not gather until they are too ripe; in both cases it is wrong, as fruit gathered over ripe or green, will not keep or give satisfaction to purchasers.

Fruits, to give general satisfaction, must be gathered so as to bear shipping and ripen at the same time.

As soon as you find that there is fruit mellowing on different parts of the tree, then it is right for shipping. This rule will apply only to summer fruits.

Winter fruits are of a more firm character and more lasting, and ripen more uniformly. They should not be allowed to remain on the tree after they are ripe and done growing, as often times they will make a second growth and burst. They should be gathered carefully from the trees, placed on piles and covered with straw to go through a sweat, and if the weather should be warm, make the covering light, if cold, increase the amount of covering. They should be allowed to remain in piles from one to three weeks, owing to the weather. Then assort the apples carefully, selecting none but good sized and sound fruit, all bruised and specked and small fruit, cast aside for the cider mill. They will pay you better in cider, than to have them mixed with your choice fruit, as a half dozen poor apples in a barrel will condemn it.

After you have your apples carefully selected, each variety by itself, the next thing to be done is the packing. First, procure nice clean barrels, place your apples on the bottom head with stems down until you have the head well covered, fill your barrels two-thirds full, then shake the barrel well so as to have your apples well settled together. Then fill the barrel full and shake as before, then place apples on the top with stems up until you have the apples about an inch above the chime, and press the head in. After the head is in, head-line the barrel and stencil the name of the variety on the head, then place your brand on the same head, and it will be ready for market or the cellar.

If the foregoing directions are carried out, the fruit will bear shipping a longer distance, carry better and bring the highest prices and give general satisfaction to all parties, and the brand will be sought after.

The peach has become a staple among the fruits, and it has been often stated that it could not be grown in this section so as to pay. From my observation, I differ from this opinion. It is said that it is an uncertain crop, and that we cannot depend upon getting a large crop of fruit more than once in three years, and a half crop every other year. I should like to know if any one can name a crop of grain grown by the farmers, that pays so well, with so little labor, as the peach crop, with all its uncertainties. The secret of disappointment is neglect; if cultivators would pay half the attention to the selection of fine varieties and the cultivation of their peaches, that they do to their hogs, cattle and grain, I would venture to say that they would realize a greater amount for the amount invested in stock and labor, from the peach crop, than any other crop that they can raise. They will cultivate a crop of corn, gather and market it and receive from 18 to 25 cents per bushel, but refuse to gather and market their seedling peaches at twenty-five cents per bushel, and often times they might realize one dollar per bushel.

Our farmers and fruit-growers will have to learn industry and economy. The great fault is the want of knowing how to raise and market their fruits. For an illustration, we have a Mr. Berryhill, living in Andrew county, and a Mr. N. F. Murry, of Holt county; they make a specialty of peaches; they have choice fruits of the most improved varieties; they realize, per year, more clear money for the amount invested, than any two of our best farmers, from their stock and grain crop. I would like to go into detail, but owing to the length of this article, I cannot. The great secret of peach success, financially, is the cultivation, marketing and the selection of varieties. As I stated before, the great profits are in the early and late varieties.

There has been great progress made within the last two years, in the peach cultivation. We have discovered this season, at St. Joseph, a seedling peach, measuring from eight to eight and three quarter inches in circumference. It is a freestone, highly colored, very sweet and juicy, with a tough skin, one of the best keepers and free from rot. It was grown on unfavorable grounds and has proven to be fifteen days earlier than the early Amsden, and far superior in every respect. There is another seedling, a fine large peach, which ripens with the Amsden; also a third, which ripens by the fourth of July, which is also a fine large peach. If fruit growers would avail themselves of the fine fruits, and give their trees some cultivation and handle their fruits in the proper time and manner, they would soon realize the fact that there is more money and less labor in fruits than any other crop that can be raised. If you ask them why they do not set out orchards of choice varieties, many of them will tell you that the market will be glutted and they will not be able to sell. I will admit that the market is often glutted with scrubs and rotten fruits, but I have never seen the market glutted with choice fruits at fair or paying prices.

There are but few who are aware of the immense demand, growing yearly, for all kinds of first-class fruits. Take Southern Kansas, Colorado and all of New Mexico, and to see the immense immigration flowing into these places daily, we will have all of this territory to supply.

Railroad communication is becoming more extended and complete, and will enable us to supply these points with our fruits, as they will never be able to grow fruits to any extent without irrigation, and there are but few points that can be irrigated, and this at a large outlay, which will prevent the growing of fruits, as we will be able to deliver them their fruit for much less expense than they can afford to raise it. We need not fear competition from Michigan, Ohio or any of the Eastern States, as the distance is too great to market, and there being a great demand from Europe for all the fine fruits that the Eastern market may have to spare.

There has been a great increase in the shipments of fruits to Europe in the last few years.

In 1862 there were 269,000 bushels; in 1878 there were over 3,000,000 bushels shipped. The foreign and home demand is increasing yearly, more than the supply is being increased.

I will restate that the most essential point is the location, the choice of varieties that are large and showy and sure bearers, the care and attention to trees, the careful gathering, assorting and packing of the fruits, using none but new and clean packages, and have the same neatly stencilled *on the ends*, so as to avoid extra handling by railroad men. If the boxes are marked on the side, they will toss them about to find the directions. If stencilled on the ends, they can see at a glance if they are piled up, and save them a great deal of trouble and avoid the bruising and the injury so often done to delicate fruits.

As this article has become lengthy, I will not touch upon berries and small fruits, but will state one important point, and that is, not to have your packages too large to have them well ventilated.

All summer fruits, whether berries or apples, should be well ventilated.

I cannot close this article without giving you a case of Nature's grafting—one that came under my observation this summer, while I was in Holt county, Missouri, packing and shipping fruit this fall: In gathering peaches one of my men found a fine, large peach growing in an apple tree. The fruit was very large, finely flavored and good color; it measured over ten inches in circumference. On close examination I found a limb of a peach tree, which stood close to the apple tree, had dropped into a fork of the apple tree. The rapid growth of the apple soon fastened the peach limb, which finally became dead at the connection with the apple tree, and broke loose.

The bark of the apple tree grew over the end of the peach limb, and since then the limb has been receiving its sustenance from the apple tree. The separation must have taken place as much as two years ago, as the end of the peach limb is nicely covered over with the bark of the apple limb.

President Colman stated that Mr. Foster of Louisiana, had promised an essay on "Pear Culture," but the essay had not yet been received.

Mr. Husmann. The pear can be easily grown from cuttings. Make the cuttings in the fall, leaving on the terminal bud; keep them in sawdust through the winter, and in the spring plant them so deep that the top bud will not be above the surface of the ground. Treated in this way almost every cutting will grow; and I have seen such cuttings make eighteen inches growth the first year. I have great faith in budding or grafting the pear on the apple, and think the early Harvest will be one of the best varieties to use for stocks, on account of the peculiar character of its wood. I have seen some unusually fine crops of White Doyenne from trees top budded on Early Harvest.

Prof. Riley. The quince, which is commonly used as a stock for the pear, is more liable to blight than is the apple, so that it is only reasonable to suppose that pears worked on apple stock should be more hardy than those worked on quince stock.

Mr. Ragan. For successful pear culture we must have a favorable location, then select our varieties with great care, and plant only those which are hardy and not liable to blight. The cultivation should be given only early in the season, so that the wood may be thoroughly matured before cold weather; should any of the wood fail to ripen well it should be cut back. I cultivate the trees five or six years, and then sow the land with clover. Fresh barnyard manure I think is often injurious, but if the orchard is so situated that it can receive the drainage from the barnyard, so much the better. Sheep droppings are also excellent manure.

Mr. Murtfeldt. I do not think there is any use in our going into a discussion on the causes of blight, or we may find ourselves compelled to follow the example of the Illinois Horticultural Society at a recent meeting, when, after a long discussion a resolution was unanimously adopted declaring that the society knew nothing about the subject. We all know that we must watch our trees closely, and that when the blight appears we must fight it with the saw and knife, cutting deep into the apparently healthy wood, but beyond this we really know very little.

Mr. Rommel. If we want healthy varieties we must raise seedlings, and keep on raising them until finally we shall get what we want.

Mr. Husmann. I have found Seckel, Winter Nelis and Tyson the most hardy and least affected with blight.

President Colman. Winter Nelis is best with me, Seckel and Tyson are also good.

Prof. Swallow also made some remarks on the subject.

The Secretary then read the following essay, by Wm. Muir:

HORTICULTURE, A POTENTIAL FACTOR IN OUR INDUSTRIAL, EDUCATIONAL AND REFORMATORY PROBLEMS.

At this, the 20th anniversary of our society, it becomes a highly important matter for us to endeavor to realize the true position of this society among the institutions of civil life, and whether we have fully appreciated our relations and responsibilities and discharged our incumbent duties. We can rest assured that if we sustain false relations to our fellows, have mistaken our duties or neglected them, we will not only be morally at fault but be commensurately punished.

When we have analyzed and discussed the questions of soil, climate, varieties, modes of culture, transportation and marketing, demonstrated the superior profitableness of fruit culture over other branches of rural life, have we not perhaps overlooked the higher duties that cluster round our profession and too sordidly bound ourselves to the dollar and cent? Have we not ignored the aesthetical, the moral, the educational of our beautiful pursuit, neglected those "better parts that cannot be taken away," and permitted purely material profit and loss to be the only criteria of value?

Our material being, as well as our social relations, is made up of separate and distinct elements, in the development of which a perfect equilibrium must be maintained, or one class of parts will be unduly strengthened and another class be dwarfed to extinction, and thus inharmony be produced that sooner or later involves ruin and destruction. Where stand we in our relations to-day?

Increase in material wealth is a sign of prosperity, so is an increase of population, but so also must be intelligence and morality among our people. The increase of wealth, if it is in the hands of only a few, tends to endanger the whole; without an increase in population the nation will decay and expire; without a proper distribution of wealth, pauperism, ignorance and crime will prevail; without intelligence and morality, wealth will prove both an individual and national curse.

Twenty years ago the great watchword was "Plant Trees." The advice was good, was given and accepted in good faith, and horticulture, in its various branches, became a power in the land. But behold, before good crops of apples were had, an era of commercial development was ushered in, and the "snort of the monster of the rail was heard." Distance and time, if not annihilated, became as dust in the balance, and north and south, east and west commingled their products, and became national, and the market was no longer St. Louis or Kansas City, or New Orleans, Chicago or New York, but the world. Competition was the ruler. Alabama and Mississippi and Louisiana and Texas came to St. Louis with their strawberries and other early fruits, and pre-sold and undersold and outsold St. Louis herself and all her local tributaries. Henceforward Missouri has no market of her own. She sells to the nation; her mart is taken from her. St. Louis belongs to the world.

Our inter-necine war made currency superabundant; every expenditure was characterized by recklessness of cost. The diet, the dress, the domestic requirements hardly knew a limit, till "by and by hard times came a knocking at the door, and then to our fair paper prospects, good night." Here we are to-day, asking with an agony of earnestness what we are to do to redeem ourselves. As a people, we have increased our wealth, increased our population, increased our princes, multiplied our paupers, increased our production of food and raw materials, increased our manufactures, mines and railways, increased our taxation, our starvation, our rags, our discontent, our crime, till the whole being is in commotion, the head is sick, the heart is faint. Where are we to turn for help? To Congress, to the Legislature, to a gold or a silver or a paper currency, to the Republican, or to the Democratic or the Greenback parties? Alas! alas! these are all like Pan to the countryman. A poor countryman had a lamb stolen; he prayed to Pan, the god of the woods, and offered him a kid if he would show him the thief. Pan agreed, and bid him look into a thicket, which he did, and found himself confronted by a lion, and then in his new distress he gave Pan his ox to deliver him from the lion. It is so with us, as a people, to-day. The demon Prodigality has taken our lamb, our kid and our ox; we see him, but it is only to be appalled and paralyzed. Wealth, limitless wealth, and wide pervading poverty. The cry of to-day is the disenthrallment of industry. Who will do it? It cannot be done for us; it may be done by us.

One of the great questions that true economy has to solve, is how to produce the maximum of effective power with the minimum expenditure of material. In the discussion of wages, labor, capital and co-operation, there is a point which receives too little attention in our efforts to solve our industrial problems, to-wit: Cannot greater economy and more perfect health be secured in the article of diet? Can we not present a cheaper and more healthy class of dietary articles than are at present in common use? We cultivate our fields to produce grass and grains and vegetables, to change into meats at a great sacrifice of health and waste of material. It requires from six to ten pounds of the best grains to produce one pound of meat, and as a rule we use too much meat for health and economy. It is a wonderful fact that the exigencies of the times cause us to inquire into conditions and force us to see beauties in laws we have been in the habit of ignoring. We can go back in the scale of time and see other than empirical considerations in the so-called obsolete requirements of Mosaic law, and we may yet learn that we have indulged in very costly liberties in the following out of that "more perfect liberty" by which we claim to judge of what is clean and what is unclean, what is lawful and what is expedient. Modern christianity with its boasted "perfect liberty," may, in some respects, be far behind the rigors of the sanitarian, economical and equable laws of Moses in the maintenance of the balance among individuals, classes, and peoples to-day. Economy will take its most effective position when it convinces us that "fruit and farinacea" must form the main food dependence of man, and that meats must be considered only as adjuncts instead of the principle articles of diet.

We think that a duty presents itself here to the attention of this and all other similar bodies. We have the conditions for an abundant production of fruit, and for its most healthy and economical substitution for meats. By encouraging a fruit diet we encourage a home demend for our products, and we can get them more purely, directly, and economically into the possession of the consumers. How can this be done? By educating the people.

When by a dire calamity the potato, the great food plant of Ireland, and to a great extent of Great Britain as well, was cut off and starvation laid thousands low, the United States were called upon for productions to meet the deficiency. Among other articles maize and Yankee beans were sent, but the people knew not how to prepare them as articles of diet. The maize had been seen only in the museums, and the kidney bean was esteemed poisonous. Wheat was boiled whole and chewed for hours, but could not pass the teeth. What was to be done? There was a great emergency. Elihu Burritt saw the point, and sent out a little tract "a hundred ways to cook corn." American cooks took American stoves, utensils and viands, started cooking classes, gave public lessons, and public breakfasts and dinners, and initiated people into the mysteries and delights of "mush" and "griddle cakes," and "slap-jacks" and "hoe-cakes," and "hominy." Showed them how to "crush wheat" before they boiled it, and put hungry men into raptures over "pork and beans" without the pork, and they thus blessed a starving people, opened up a great international trade in "bread stuff," and at the same time made nice little fortunes for their enterprising teachers of Yankee cookery. Well do I remember how delighted thousands thought that instead of the mountains ot bread coming to them they would go the mountains of food, and thus untold families have by immigration blessed themselves and blessed the land of their adoption.

Can we make a suggestion here? Our society can aid fruit producers, and aid the industrial classes by showing them that cheap, healthful, beautiful fruit is not a luxury, but can be made to take the place of animal food, and that cooking schools and cuisinarial literature are the powers by which this can be accomplished.

One other important point demands attention, to give greater durability and portability to our fruit products. The drying, desiccation and concentration of fruits are worthy of the most careful attention by this society, and deserve every encouragement as exerting an important influence, not only on the home consumption, but also on our foreign demand.

It is a fact familiar to many here, that the early French settlers used but little of the flesh of the hogs they raised. They turned them mostly into lard to cook their grain and vegetables. Vegetable oils are used by large branches of the human family, and it is not too much to say that not only Olive oil, but Sunflower, Cottonseed and several other vegetable oils will be so purified as to be rendered palatable and economical articles of diet.

We are not to be supposed to urge here an absolutely vegetable diet, but we do think that its adoption to a great extent will be conducive to health and economy.

THE EDUCATIONAL PROBLEM

Takes a high position among the thinkers of to-day. We have got beyond the ages in which the education of the world was locked up within the wall of the "cloistered cell;" thence classical education came forth like light shining in the darkness, yet, again it moved on, mantling the alchemist and the empiricist, and transmuting them into the scientist of a thousand specialties. Professional education has been stamped with success, utility, honor and emolument. To-day the industrial mass sees that labor and learning must go hand in hand, and they call for an education adapted to their needs. It must be broad enough to cover all, elastic enough to adapt itself to every condition, so subtle that it can permeate and add grace to every child of toil, rendering advancement possible in every department of civil life. Industrial education is pushing itself nobly to the front and demands that the public school system be moulded to such a form that it will become the ground work, the foundation on which any special education can be built, but on which all must be equal. There must be less uninteresting mummery and more of mind, of fact, of everyday life. Our existing text-books and methods must be changed, re-adapted, and the eye, the hand, the ear be made familiar with the objects with which they come into daily contact. Oral teaching will displace dry rote, and the glories of nature gild the school-room, and satisfy the longings of awakening powers for true knowledge. It is most beautifully said that "fine fruits are the flowers of commodities," and these open and hold the youthful mind best. They first see and admire, then taste and enjoy, and then strive to produce. Metaphysical truths to have practical power must have living symbols. The trees, "pleasant to the eye and good for food," stimulate to industry towards their production.

The great Creator could have caused His chosen Israel to worship Him under the blue sky, through the pale moon, the twinkling stars, the glaring sun or the vasty deep, but He chose to be worshiped by His ancient people in the Tabernacle and the Temple, by the works of their own hands, the products of their own industry and skill, with the first fruits of their wine and oil, and grain and cattle; the choicest of nature's and man's productions were sacrificed to His worship. Industry, skill, labor: the door of access to God's august presence, how grandly elevating the thought! God's first gift to man was "every tree that was pleasant to the sight or good for food." Man's first effort in the world was to dress and keep the garden. All down through the course of time man's honorable association with the products of the ground is traced in unmistakeable and oft recurring statements. The sign of the purged world was the "Olive branch." The evidence of God's divine commission to Aaron was "the rod that budded" placed in the Ark of the Convenant as an ever lasting memorial. Joseph's pre-eminent greatness was figured as "a fruitful bough by a well." The waters of Marah were made sweet in the desert by "a tree being cast into them." The desirability of Canaan was shown "by the grapes of Eshcol." One of God's first commandments to the children of Israel on possessing Palestine was "to plant all manner of trees for food." The material and decorations of God's sanctuaries were the products of the forest, field and mine. The Pontifical garments were adorned with fruits and flowers. The incense offered before the Lord were of

"Myrrh, Cinnamon, Calamus, Cassia and Olive Oil." The people had to come to have their persons "perfumed with sweet spices" to be acceptable to God. The purification from sin and disease was by "Cedar wood and Hyssop." The "first fruits" of the field and flock were presented to God. The feast of Harvest was at once a religious ceremony, and a recreative social gathering. "The want of labor" was pointed out "as a danger," and "the tree of the field as a man's life." The emblem of peace, plenty, and contentment was "every man living under his own vine and fig-tree." The wisdom of Solomon was made apparent by the fact that he "spake of trees from the Cedar of of Lebanon to the Hyssop that springeth out of the wall." The want of economy was denounced because "much food is in the tillage of the poor, but there is that is destroyed for want of judgment," just as we see it now. The judgments of God as illustrated, "He destroyed the vines with hail." Total desolation is foreshadowed by "They cast stones on the good land, they felled all the good trees." The national estimates of true greatness became changed, "A man was famous according as he had lifted up axes on the thick trees, but now they break down the carved work thereof at once with axes and hammers." We stop to put our finger on this point, and ask if the evils that are upon us now as a people do not spring from this very cause. A man who desires to become famous does not now lift up the axe upon the thick trees. No, he throws down the axe, leaves the plow to live by his wits, trades, teaches, gambles, aye, steals rather than work. Our school desks are filled with labor shirkers, who cannot communicate true ideas of industry, and who do not know enough of it to imbue their pupils with correct views on this point. The absolute incompatibility of labor and learning, and true dignity is taught from the district schools on up through society. Whenever a young person is distinguished for any real or supposed mental or educational superiority, he is incited to seek distinction in some other sphere than in a simple industrial art. All this can and must be changed or ruin, hopeless ruin awaits us. Our hope for the future is pure, thorough, practical, ennobling, industrial education. But there are also duties in connection with the great reformatory problem that plead for some consideration. There is no hiding of the fact that crime holds high carnival in our land. The detection and punishment of crime forms one of the greatest items of cost to our government, and requires armies of officers to hunt and discover criminals, and yet it is powerless to prevent its commission. The hope of eternal bliss and the fear of eternal woe are alike, powerless. Education seems but to offer new opportunities for its committal, and new modes of concealment or escape, till astounded thinkers stand aghast, baffled. Some denounce gambling, sensuality, intemperance, in which they think they see the cause of our growing evils, and try to lop off and prune their rampant growth. But there is room to believe that the disease is yet deeper seated, and the remedy more organic than the mass of men wot of. Intemperance in the use of alcholic liquors is a great evil, but is only one phase of a fell disease that exists in the body and mind's unnatural stimulation. The only true, pure, universal, natural stimulus, *physical labor*, is ignored, evaded, disowned, and as a consequence, natural, healthful, simple appetites are almost unknown. Gross animal foods, condiments, drugs, cosmetics take the place of natural stimuli; and opium, tobacco and alcohol are sought out to supply the demands. How often has society been horrified at the awful depths to which the children of parents, esteemed the leaders of morality and religion in society have fallen, and bewildered brains have reeled under the inquiry, and piously laid it all to the unfathomable mysteries shrouding the actions of the Great God! The most of the reform ideas of to-day are too superficial. Co-operation, temperance, aye Christianity, are paralyzed, because the subjects on which action is desired are not in the proper condition to receive it. Let us examine the case just a little, in its higher aspects. Before the human heart has beat an independent pulsation, it has been formed under unnatural conditions, from impaired material, handed down in an intensified condition, from generation to generation. These impaired forces are retained in action by drugs, cordials and stimulating concentrated food; they are nursed along to duty by opiates, fed with tobacco, revivified with alcohol, and regulated by poisonous drugs; the mind is crowded with one impulse and excitement after another, till excitement and life are held as synonymous, and we have as a result a being formed of bundles of nerves, acting under powerful artificial influences, with just as much of the animal as hold them together and keep them for a few years in contact with external objects. In this condition, how easily they are carried away and how far they can go in a short time! We want men and women to pause here. How many may, like Nebuchadnezzer, have to fall from this condition of feverish madness, and for seven years have to associate with the lower animals before they can be restored to their right, mind, their perfect humanity. From them learn to breathe more fully and freely of purer air, become more truly, more powerfully animal, and seek, through labor, purer appetites and simpler diet.

What is the grand lesson of the Mosaic dispensation? Sanitary law to secure a true and pure Jehovah worship, and the reward of health and pure enjoyment here, and a Canaan byond.

What the glory of Christianity and its potency on earth? "Know ye not that your body is a temple to the Holy Ghost." Oh! can we, can we wonder if the Holy Spirit can neither enter nor dwell in bodies drugged, squeezed, narcotized, alcoholized and animalized as we find them to-day from before the first spark of life is seen. If the ancient philosophers saw and taught "*sana mens in corpore sano*," how important to us such inquiries? If diet builds up our bodies and we assimilate our food, do we not become largely hog, ox or coon? Our great hope for reform is not in party, creed or ism, but a return to nature in its purity.

We must have labor honored and practiced; we must have more natural modes of life; simpler diet and drink, less of the punitive, more of the positive. Fruits are our strong points, we present our calling as a great agent in true reform. Industry guided by intelligence, rewarded by comfort, crowned by virtue, rendering religion in its highest sense possible. We live in the glorious faith and hope that the trees will bear manifold fruits, and that really, as well as apocalyptically, the "leaves will be for the healing of the nations."

Recess.

EVENING SESSION.

Meeting called to order by the President, at 7:30 P. M.

The first paper presented was an essay by C. W. Hollister, of Pike county, on

MARKETING ORCHARD PRODUCTS AND SMALL FRUITS.

The day has fully dawned which claims the close attention of the successful and progressive horticulturist, in order that he may keep pace with the improvements made necessary in procuring a fair remuneration for the labor and capital, which holds good as well in regard to agricultural persuits and all industries incident to production. manufacture, and the mechanic arts.

As fruit growing must come before fruit can be marketed, it may be well to consider some of the elements incident to the remunerative production of fruits. The principal of which are a suitable soil, climate, varieties and location, to these as indispensable profits over the cost of production, must be added, practical education, system and good judgment, with a large share of painstaking labor and tireless zeal; with these qualifications and a liking for his calling, the horticulturist may feel assured of both pleasure and profit. Having got fairly started, the next important move will be to decide on the best market for the fruits he is raising for sale, and the best and most attractive manner of packing and fowarding to market, bearing in mind that as "goods well bought are half sold," so with attractive fruits put up in neat and inexpensive shape, his heaviest task is done; the good or ill appearance has much to do with the sale of orchard products; this holds equally good both as to the fruit and the package which contains it.

From the earliest period the appearance of fruit has had attractions for mankind, and womankind as well, as evidenced in that tableau of which we have an account in the text book to which we frequently refer, and read as a guide to agricultural and horticultural matters, and find it the very best of authority. In Genesis we read, "And the Lord God took the man, and put him in the garden of Eden, to dress it and to keep it. And when the woman saw that the tree was good for food, and that it was pleasant to the eye, she took of the fruit thereof, and did eat and gave also to her husband with her, and he did eat." Surely the appearance of the fruit secured a customer, though not a very profitable one, and for this palatable lunch, partaken of by our grandmother Eve, mankind is yet working out the penalty, "In the sweat of thy face shalt thou eat bread."

The above deflection from the path of duty by the weaker sex, is lamentable, but at the present day is being in a measure offset by the helpmeets of the successful horticulturist, in rendering such aid as to win the appellation of much his "better half."

The horticulturist, to succeed, must learn that it is the best of his fruits which pay him the largest profits, as, while a medium or poor article of fruits will, as a rule, barely pay for shipping expenses, and sometimes bring him in debt, the strictly choice article finds ready sale, at prices which return a fair profit on the cost of production. The freight on a barrel of apples which will bring only one dollar, costs just as much as that on the barrel which commands two dollars, so that it does pay to devote the most arduous labor to cultivation and thinning, whereby large, and uniform, good and sound fruit of attractive appearance can be relied. upon, provided your climate and soil are suited to the best practical development of meritorious orchard products.

In this matter we speak from experience, having handled large quantities of both large and small fruits, and can scarcely urge too strongly the necessity for the strictest and unwavering integrity in packing fruit for distant markets. Let the peach box or basket be filled with good, even-sized fruit, of uniform color and ripeness, let there be no deception, no "stocking" by placing fine showy fruit on the top, and filling up with comparatively worthless material. The same will hold good as regards barreling apples.

It will pay the orchardist far better, if he has not thinned out the surplus apples while young, to make two grades, and if needs be, in separating, putting by more for cider, as small, unsound or wormy apples will not pay for freight and barrels.

It is not our province at this time to discuss the temperance question. The husbandman should be allowed, in these days of low prices for farm and orchard products, to utilize his products in such manner as will secure the best returns for crops raised; a large portion of the apple crop will have to find a market either in cider or brandy, or prove a dead loss to the producer. The same may be said of the products of the vineyards, as the prospects of making the growing of grapes profitable to any extent, without resort to the wine-press, is not at present among the possibilities.

Although prices realized for orchard products the past year have not been fairly remunerative, yet looking to the vast area of our bluff-formations in Missouri, which are especially adapted to the production of the choicest fruits, and with climate unsurpassed by any State in the Union, horticulturists have only to press forward with redoubled efforts to grasp the treasures so bountifully displayed from every hillside, and the numerous valley plantations of small fruits, all of which respond in the most pleasant and profitable manner to the hand of man, in such profusion as to render our noble State a second Garden of Eden.

Mr. Murtfeldt: Honesty in packing is an item of very great importance. Dr. Haller, one of the most successful fruit growers of Illinois, always exercises the greatest care in packing, and always received the highest price for his fruit. In packing peaches, for instance, he packed them so that there was but one peach in the basket which could not be seen from the outside of the package, so that customers always knew just what they were getting. He averaged over twelve dollars a tree for his cherries, because he had them carefully arrested and carefully packed. He also thinned his fruit to secure better specimens and more even ripening. Mr. Wright, another extensive fruit grower for the St. Louis market, used the same care in packing, and "Wright's peaches" always sell. If customers can be sure of what they are getting, they will buy a great deal more than when they have to take the chances of half the package being inferior fruit.

Mr. Ragan: I always pack very carefully, and put in none but choice fruit, but the commission merchants frequently sell my selected fruit at the same price as ordinary fruit which has been packed without assorting. In order to make fruit carry well, it must be packed perfectly tight, so that there can be no shaking about in the box; and in order to accomplish this, it is frequently necessary to put in some small specimens to fill otherwise vacant spaces. Packing in this way the customer gets his full quota of large specimens, and the few small ones extra. No bruised or wormy fruit should *ever* be put in the package. I always put my name on each package of fruit, and customers, with whom I deal direct, always call for more, but when I sell through commission merchants, very frequently no attention is paid to quality.

Prof. Swallow read the following essay on the

IMPROVEMENTS OF PLANTS:

Plants are improved by various operations adapted to the nature of the plants and the changes desired. Those modes succeed best which are based upon the

NATURAL TENDENCIES OF PLANTS.

Some of these natural tendencies must be understood to secure success in the work of improvement.

1. All plants have a manifest natural tendency to preserve their essential characteristics and to perpetuate their species.

a. A vast multitude of plants have continued through all the periods of man's existence, without any essential changes. The Garlic that fed the Pyramid Builders is still the Garlic of Ascalon.

b. Many thousands of plants lived and preserved their identity through vast geological periods.

These and similar facts establish this law of the vegetable kingdom.

2. "All species have continued to propagate themselves by seed, without losing their specific peculiarities; some appointed law has rendered them and their several natures eternal."—Lindley.

2. Plants changed by natural or artificial causes have a strong tendency, when these causes are removed, to return to their primitive conditions.

a. It is the general experience of farmers and horticulturalists, hat plants highly improved, do deteriorate and retrogade toward their natural condition, unless special care is taken to keep up their improved condition by the best modes of culture, and by renewing the seeds or buds from other localities.

b. "There can be no doubt that if the arts of cultivation were abandoned for only a very few years, all the annual varieties of our gardens would disappear, and be replaced by a few original wild forms—."Lindley.

c. "That varieties will last as long as man takes care of them, seems to be proved * * * * But it is also certain that negligence will cause some to disappear."—De Candolle.

3. But there are facts which very strongly indicate that improved varieties do often deteriorate under the most favorable circumstances.

a. The pears about Paris, the apples of Herefordshire, England, and the gooseberries of Lancashire, have deteriorated, although it is well known that these fruits have had the very best culture in those localities.

4. But few improved varieties of our fruits in this country can be propagated by seeds.

a. "There is always a tendency in our varieties of fruit trees to return, by their seeds, towards a wild state."—Downing.

b. Dr. Lindley has attributed this very marked natural tendency of our fruits to return to "their wild state, when raised from seeds, to accidental crosses with wild races." But it seems more reasonable to refer it to crosses with the improved varieties so extensively cultivated together.

c. We have analagous facts in the animal kingdom. Pigeons produced by crossing the most varied races, often show marked characteristics of the original wild stock.

d. Improved varieties, left to themselves, would thus return to their original wild state.

e. Our improved fruits must be propagated by buds to preserve them from deterioration.

5. Careful culture alone can preserve the good qualities of our improved plants.

a. Those modes of culture and conditions of climate which produced the improvement, will best preserve its integrity.

b. Many of our improved races were produced by selecting the seed of the best; and those races can best be kept up to the highest standard by the same mode of selection.

6. Plants are never so changed as to obliterate all the characteristics of the original species.

a. Our cherries come from several species, and although they have been cultivated these two thousand years, and in all quarters of the globe, and hundreds of excellent varities have been produced, there is no difficulty in determining from what species each came.

So the various apples, pears and plums retain the features of their original species.

7. There are limits beyond which plants cannot be changed.

a. Gooseberries have yielded many marked varieties of great size and beauty; but even the skill and untiring zeal of the Lancashire growers of this favorite fruit, have not been able to increase the size of their berries for some years.

8. Some plants change not. They make no sprouts, and resist all the arts of man to produce any material changes.

9. Plants often show some sudden and marked changes in some of their parts. These changes are called *sports.* No explanation has been found for such sudden changes.

a. To-day I received the stock of a sweet potato, upon which were two red tubers and four white ones. The white are sports.

b. By planting and selecting for several years, the white sports may be made into a permanent race.

10. Plants have a tendency to change when their conditions of soils, climate and culture are changed.

a. In a richer soil, plants grow larger.

b. If the growth of wood be checked, the tendency is to produce more, larger and better fruit.

c. Changes of climate often produce marked changes in plants. European grapes grow well in California, but greatly deteriorate in the eastern and central States.

The Castor Bean is a perennial tree in its native India; but in our climate and soil it is an herbaceous annual.

11. Good culture and careful pruning seem to impart to the seeds the tendency to improve.

a. This tendency to improve is increased by selecting the best seed from the best plants.

b. By this principle Prof. Van Mons converted seedling wild pears into many of our best varieties.

MEANS OF IMPROVING PLANTS.

By taking advantage of these natural tendencies of plants, we may secure improved varieties and races in a variety of ways, which may be considered under seven heads:

I. By propagating sports.
II. By proper culture.
III. By selecting seeds.
IV. By Hybrids.
V. By Crossbreds.
VI. By regulating the light.
VII. By debilitating the seed.

I—BY PROPAGATING SPORTS.

1. When a plant shows some marked change in some of its parts, as in the leaves, flowers or fruit, the sport may be made permanent by propagating the parts changed.

a. Sometimes a peach tree produces a peach with a smooth skin. By planting the seed, a tree may be produced, which will produce more smooth-skinned peaches, and by continuing to select the seeds of the smooth-skinned fruit for several generations or until the trees produce none but smooth fruits, we shall have a new variety of Nectarines.

The Moss Rose was obtained by propagating the branch of a Provins Rose, which had produced a flower with stalk and calyx covered with those glanular appendages called moss.

c. Many double flowers were obtained by propagating plants which had formed double flowers as sports.

d. In fact a large number of our pants with beautiful foliage and flower and fruits, have been produced by propagating sports in the leaves, flowers and fruits.

II—IMPROVED BY PROPER CULTURE.

a. Varieties may be produced and improved by skillful culture. Although it seems to be the primary tendency of plants to grow, and a secondary matter to produce flowers and fruit; yet by man's art, this tendency can be so changed that the production of good flowers and fruit will appear to be the main object, and growth only a means to that end.

b. Rich soils and good tillage make plants larger and more vigorous. If the strong plants thus produced are closely pruned, the growth will be checked and the flowers and fruit made better and larger and more abundant.

c. By such culture and pruning, improved varieties may be made better and new varieties started on the road of improvement; but there seems to be a limit to the improvement thus secured far below present standards of excellence ; and it has been found necessary to add to tillage and pruning other means of improvement.

III—IMPROVEMENT BY SELECTING SEEDS.

a. It is a well known law of the vegetable kingdom as well of the animal, that *like produces like.* By availing himself of this law, man has produced many most excellent races and varieties of plants.

b. The famous Baden Corn, so well known for its productiveness caused by the large number of ears it bears on a stalk, was produced some years since by carefully selecting seed from the stalks which produced the largest number of ears. This mode of selecting joined with good culture, was continued by Mr. Baden for 23 years, and until he secured corn that would yield 5 to 8 ears to a stalk, and 120 bushels to the acre.

c. Plants have also been made earlier, larger and better by the same mode of selection and culture.

d. Prof. Van Mons of Belgium, by applying these means of improvement, gave the world some hundred good varieties of fruits. Several of our best pears, as the Beurre Bose, Marie Louise, and Beurre Easter, came from his use of these principles.

c. But few men of the nineteenth century, have done as much for the happiness of mankind as Prof. Van. Mons in demonstrating the efficiency of this law in improving fruits and flowers. Whoever tastes these delicious pears, may well bless Van Mons for showing the best way of producing such delicious fruits.

IV—IMPROVED BY HYBRIDS.

a. A Hybrid or Mule, as in the animal kingdom, is a cross between two species; as the Norton Grape between the Bland a variety of *vitis labrusca* and Miller's Burgundy, a variety of *vitis vinifera.*

Hybrids have often proved greatly superior to the parent plants.

b. The process of hybridising is very simple; but it requires great care to secure a pure progeny, as there are so many sources of inacurate results.

c. But it should be kept in mind that the first flowers and fruits of Hybrids, do not always show their true characters; as the succeeding crops are often vastly better than the first. This is well shown by the history of the well known excellent cherry, Black Eagle, which was at first pronounced worthless. But peculiar circumstances prevented the destruction of the original tree, and its subsequent crops of fruit were so improved as to show its great excellence.

d. The time in which hybridising will succeed, is very limited. The pollen must be ripe as shown by the opening of the cells, and the stigma must have secreted its peculiar viscous fluid to retain the pollen and render it active.

e. The process of fertilization, often occupies some weeks and the pistil must not be disturbed after the process commences until it is finished.

f. Parent species must belong to the same genus to make the success of Hybridising probable; for it has been rarely successful between species from different well marked genera. Some cases of muling between species of different genera have been reported, as between the pea and the bean, but such accounts have appeared apocryphal to the best judges.

g. It has even been found impossible to mule many species most closely related in the same genus; as the Morello with the Common English Cherry, the Gooseberry with the Currant, and the Apple with the Pear.

n. The best time for the operation, is in the fair weather of spring and summer.

h. Good healthy plants which bloom at the same time, must be selected for parents. As soon as the flowers of the plant chosen for the mother, are open, all the stamens must be carefully cut out and removed without injury to other parts of the flower, and the pistils must be carefully shielded from every possible approach of pollen by means of water, air or insects. Glass or gauze, or some other substance which will prevent the passage of pollen grains and not greatly obstruct the sun's rays, may be used for this protection.

When the viscous secretion appears upon the stigmas, the pollen of the paternal plant must be shaken on them, and the protection continued till the stigmas dry up.

i. The seeds of the flowers thus fertilized will produce plants intermediate between the parents, having some characters and wanting others of each parent. Some will more resemble the maternal parent and others the paternal.

j. But hybrids are sometimes larger, hardier, earlier, and more fruitful than their parents. Thus some hybrids may be grown in climates where the parent plants could not succeed.

Several of our most valuable hardy fruits and flowers are hybrids from parents, one or both of which are too tender for our climates; as shown by several of our hybrid roses and grapes.

k. But few hybrids are fertile. Some horticuluralists even contend that none are. It is said that seedlings of such as are fertile are often superior to the parent.

V!—IMPROVEMENTS BY CROSS-BREDS.

a. Cross-breeding is performed with two varieties, in precisely the same way that Hybridising is with two species. The same care and precautions are necessary to secure pure cross-breds.

b. But a very large proportion of cross-breds have been obtained from the seeds of plants crossed by natural causes, such as the transportation of the pollen by wind and insects. The results from seeds thus fertilized, must be much more uncertain.

c. Crossbreds are usually fertile, but few of their seedlings are like themselves. Those which do not propagate themselves by seeds, form varieties, and must end with the cross-bred plant, unless propagated by buds; whereas, if any one does propagate itself by seeds, it may form a Race, and be independent of buds for a prolonged existence.

d. Cross-breds are sometimes hardier, earlier, larger and better than their parents.

e. A large proportion of our best apples, pears and peaches are cross-breds.

1. The results of Hybridising and Cross-breeding, are very interesting and instructive.

a. Very many of our most delicious fruits and beautiful flowers are Hybrids and Cross-breds.

By this beautiful art, Mr. Thos. Andrew Knight, of England, produced many of our best apples, pears, peaches, plums and cherries.

b. While we are indebted to artificial selection and culture in the hands of Mr. Van Mons, for some of our best pears, we have a like debt of gratitude to hybridizing and cross-breeding in the hands of Mr. Knight, for such cherries as the Elton and Black Eagle.

c. Thousands have followed these pioneers in these modes of improvement. Marked success has crowned the labors of many of our own countrymen, in producing improved fruits. Of the very many we may mention, such pears as Seckel, Onondaga and Clapp's Favorite; of apples, Early Harvest, Rambo, Rhode Island Greening and Janeton; of peaches, Foster and Amsden; of plums, Columbia, Washington and Smith's Orleans; of cherries, Governor Wood; of the grapes, Concord and Massasoit; of gooseberries, Smith's Improved and Mountain Seedling; and nearly all our best blackberries, raspberries and strawberries are American varieties.

d. But the end is not yet. Zealous cultivators will give us new races and new varieties, until our fruit lists are full of the very best native products.

VI—BY REGULATING THE LIGHT.

Some changes produced in plants to fit them for certain uses, can scarcely be called improvements of the vegetable economy, though the plants thus changed are better adapted to meet our wants.

I. Variations in color may be produced by regulating the light in which the plant grows.

a. Plants grown in the dark are colorless. Advantage is taken of this to grow asparagus beneath the soil and cover up celery stocks, that they may come to the table bleached.

b. Fruit has brighter colors when exposed to the direct rays of the sun. By this principle, bright colored letters or figures may be photographed on the cheek of a peach, apple or plum.

These beautiful results may be secured by cutting the letters or figures in paper and placing them over the ripening peach in such a manner that the sun will shine through them upon the cheek of the peach, while all but the shape of the letters are shaded. This will give the natural bright color to the letter-shaped portion exposed to the sun and keep the other shaded parts paler.

c. Variations in color may also be produced by placing plants under colored glass; but this matter has not been sufficiently investigated to settle the rules for its application.

d. Variations in color may also be produced by adding substances to the soil. Charcoal produces marked changes in the hydrangea and other plants. As a rule, charcoal and peat intensify the colors of some plants, and change the tints of others.

e. White flowers may be changed by putting coloring matter in the soil when they are in bloom. If the soil in which white hyacinths are blooming, be freely sprinkled with the juice of pokeberries, the white flowers will change to a red in a few hours; but the red will again disappear as the juice is washed out of the soil or decayed.

VII—BY DEBILITATING THE SEED.

1. Seeds planted as soon as they reach maturity, will germinate quicker and produce stronger plants than those kept a long time before planting.

a. It is evident that seeds by age gradually lose their vital energies, until in time vitality is lost.

2. Plants produced from seeds debilitated by age, are often more fruitful than those more vigorous from fresh seeds.

a. Long experience has shown that cucumbers and melons from old seeds will produce less vines and far more fruit, than those from fresh seeds.

It is difficult to explain this fact except on the principle that vigorous plants become more fruitful when the growth is checked by pruning or other means.

3. In some species, it has been found that debilitated seeds very generally produce plants with double flowers.

a. If the seeds of the Ten Weeks' Stock are sown as soon as ripe, the seedlings will produce single flowers, but if they are kept three or four years before sowing, a large part of the plants will show double flowers; but seeds of many other species thus debilitated, will not give seeds with double flowers.

b. In fact, science has failed to develop any principle by which double flowers can be produced with certainty. Many have been produced by propagating sports and others by debilitated seeds.

Prof. Riley: All of the statements made in the essay are measurably true, but some of them should be somewhat modified. Species are not permanent as was asserted, and it is entirely through this instability of species that any improvement is possible. Careful and scientific work is necessary for the production of new and improved fruits, and the Agricultural College cannot do a better work than obtaining new varieties of all our cultivated plants of better quality and better adapted to our climate than those we now have.

Mr. Ragan: I am glad to hear Knight and Van Mons receive the credit due them for their labors in giving us improved fruits. Kirtland and others in our own country, deserve just as much credit, and should receive it. The production of improved varieties requires time and skill, and is often a very discouraging work. Frequently new varieties do not develop their true character for several years after beginning to bear fruit, and when a seemingly superior fruit is produced it must be fully tested before it can be recommended.

Mr. Husmann: Seedling fruits seldom do as well when young as they do when the plants are more fully matured. If a seedling tree promises well at its first bearing, it should be given a fair trial before being discarded.

Mr. Rommel: The Elvira grape is an example of this. At first the vine bore only a few very small clusters, but the fruit has improved in both quality and quantity for seven years, and now I regard it as our most promising wine grape.

Mr. Husmann: I can corroborate all that Mr. Rommel has said of the Elvira. I have the grape and like it very much. It is a seedling of Taylor—is a fine white wine grape—makes a wine resembling the Reisling.

Prof. Swallow: Prof. Riley has criticised what I said in regard to stability of species. In making my strongest statements, I was careful to say that I quoted from Lindley, the highest English authority. I do not wish to enter into a discussion on the subject of evolution, but I do say that although species may vary and "sport," still the tendency is always to revert to the typical form.

The Secretary read an essay on

FARMERS' FRONT YARDS.

BY CHAS. TURBNER.

Who that has seen Central Park, N. Y., the public gardens of Washington, D. C., or even Lafayette Park or Shaw's Garden of St. Louis, did not experience a feeling of delight and exquisite pleasure at the beauties of nature there displayed, assisted and developed by art? And who has come away but what did so reluctantly, and wishing he could forever enjoy the beauteous and ever-varying scenes that met his eye? Yet, although many yearly visit such and similar scenes—and come away with a desire to have their own grounds adorned, if only on a small scale—few carry out the idea thus conceived. It is too expensive, or they are just too busy, or some other excuse is had recourse to, and their home remains as it was.

How refreshing to a weary pedestrian is the shade of trees on the wayside, and how filled with pleasure and gratitude are those who view and admire a garden well kept, and adorned with beautiful shrubs, evergreens and flowers! In winter how comfortable and pleasant a house seems nestled among evergreens, which give it the aspect of summer! How bleak and dreary one that cannot boast of such enlivening objects! A lawn well kept, a few shade trees distributed around the house, some flowering shrubs and roses intermingled, wonderfully change an otherwise desolate looking house. The cost, too, is comparatively small, and so amply repays that everyone ought to have his home surroundings beautified. Farmers, as a rule, are most neglectful and indifferent as to home adornment—and to their own detriment, for evergreens and flowers, as well as fruits, have their beneficial effects, besides enhancing the value of the property and conducing to the comfort of the owner by sheltering and screening, if rightly planted, the house and surroundings from the fierce northern blasts in winter, especially on the open prairies. Having of late traveled considerably through one of the finest farming sections in the State, I was struck with the scarcity of attractive homes. The houses, as a rule, are large and tasteful enough, but the surroundings are such as to form a sorry contrast. Back yards, too, often are an eyesore, when, with little work even, they might be kept neat; but, as they are more secluded, they are not so easily noticed, and therefore of less importance. With front yards the case is different, and there is no excuse for the careless and indifferent manner in which these are arranged. No doubt the fact that so many young men leave the farm and flock to the cities is, in a measure, due to the lack of a tasteful and beautified homestead and the culture and refinement it engenders.

In cities we generally, though not always, find a different state of affairs. There the front, and often the back yard or garden, is kept neat and tidy, and tastefully laid out in beds and walks, or as a lawn, dotted with evergreens, shade trees and flowers; and it is often this that attracts and fascinates the youth of the country, who, at home, seldom see aught but the flowers of the field.

Farmers, generally, devote their time and energies too exclusively to farm work. Their sole ambition seems to tend in one direction—that of adding acre to acre, in which the children are trained to follow, and, in so doing, sight of the different cravings and wants of children is lost.

Few stop to consider that a child is very easily influenced by the surroundings in which it grows up, and that these are all important in forming the ties which bind it to home. Many lose sight of the fact that in every child lies dormant a love of nature, of the beautiful, which should be brought out and fostered, and not left to die out, as is often the case, causing them to seek a perverted mode of gratifying their wants, as so many do, by forsaking their homes for the allurements of the city. Let every farmer make his home such that it will not suffer in the contrast with a city home. Let their homes be not only a place of shelter, but of attraction as well, to which their children will always feel drawn, and which they will ever hold dear in memory's shrine. When taking into consideration the little work it takes, if done at the right time, the small outlay necessary, and the material within easy reach of every one, it is surprising that so little is done. Hard times and pressure of work are but poor excuses, because a few pounds of blue grass seed for a lawn, and some forest trees, such as the sugar or hard maple, soft and silver maple, box elder and elm are easily and cheaply procured. These are with the exception of the first mentioned, rapid growers, and all are not excelled as shade trees.

No one need go beyond his means. One of the neatest and prettiest homes I have met with was that of a laborer, who, after he returned from his work, every evening spent an hour or two in the small lot surrounding his cottage, first laying sod, which he cut on the commons near by, hauling it home in a wheelbarrow; then, as he could afford it, planting shade trees along the sidewalk and a few evergreens and rose bushes or other flowers inside, keeping the whole scrupulously clean and trim.

Every beginner surely can spare a few days the first spring he settles on a farm, to go to the forest for a few trees, and set them around his house, fence in a yard and sow it down to grass, adding every year a rosebush, a shrub or an evergreen. Of course, it is not expected that every farmer have a fine flower garden like his city cousin (though many might), but he certainly can and ought to devote the small amount of work necessary to start a lawn, plant some trees and shrubs and take care of them, the whole requiring but little labor after once planted. I have seen many attempts at adorning homes made, but they were too often of a nature calculated to elicit a pitiful smile, rather than praise. I have seen many handsome residences surrounded and often completely hid by that most hideous and worthless of shade trees, the locust, a tree which I would never allow to grow near a house, as it is a nuisance on account of its incorrigible propensity to spread by suckering, and if not continually checked, soon covers the ground. Besides, it is not a handsome tree, nor is it desirable for shade, while the leaves, small and light, are carried all over the house, into every room and nook, after the first autumnal frost.

Too often the ungainly in form are given the preference over the beautiful, on the plea of novelty and rapidity of growth, and, in consequence, locusts, poplars and ailanthus—the poorest among shade trees, are planted. This is a mistake, and in time will work dissatisfaction and regret. Surely some of our forest trees, especially those I have mentioned, are much handsomer in foliage and form. One drawback to the improvement of front yards is the shiftless practice of turning horses, cows and calves to them, to keep down the grass and weeds and to avoid a few hours' mowing. Many yards are thus ruined, or kept from being improved. There are many cases where the wife and daughters would take care of the yard, did the husband but fence it in properly, and refrain from turning in his favorite saddle horse.

I have addressed myself chiefly to farmers, because my sympathies are with them, having been born and raised on a farm, and because I believe it the duty of every farmer to educate his children and teach them to understand and admire nature, and instil in their minds a love of the beautiful, as well as teaching them to be diligent and capable of earning a living. After subscribing and paying for good papers, beautify your homes by adorning your front yards.

Mr. Murtfeldt: I would inquire, Mr. President, if the Commissioner on Permanent Seat of Government is present. I wish he were here, because there is a front door yard in this city, viz: the one surrounding our State Capitol, which is a shame and a disgrace. The few dilapidated cedars which adorn (?) our Capitol grounds are an eyesore and a pest. The walks are trampled over by horses and cattle, and are in a shameful condition, and the way manure is spread by dumping it in a pile and employing a Berkshire pig to root it over, is unique if not novel. I should be sorry to know that a single man not a Missourian had seen it.

Mr. Geo. Husmann, of Sedalia, read the following essay on

EVERGREENS—VARIETIES BEST ADAPTED TO OUR STATE, THEIR CULTURE AND MANAGEMENT.

Evergreens! The very name has a cheering sound, reminding us of eternal youth, fit emblem of immortality. Hard and sordid indeed, must be that heart which can be callous to their enlivening influence. They have been used from time immemorial to usher in that loveliest of all our festivals, Christmas. In England, the Holly with its bright green leaves and scarlet berries, is used for decorating the festive hearth; in Germany, the glorious Christmas tree, with its glittering toys and shining candles, is the emblem of the light which dawned upon the world, and the immortality of faith. When our beloved ones are taken away from us, we lay a wreath of evergreens upon their coffin as a token of life immortal, and that we "will keep their memory green" between us. And how much more like home is the dwelling surrounded by them in winter and sheltered from the rough blast than the bare and cheerless house, however costly it may be, which has no living shrub or tree around it? Nay, even the speculator who builds houses to rent or sell, can make no better investment than to plant some evergreens around them, for every renter or purchaser will give more for such a homestead than simply the walls of brick or wood. Look upon them as we may, as ornament around our dwellings and in our parks, as well as shelter for ourselves and our farm animals, their value is apparent, and it becomes indisputable that everybody and his neighbor should plant them. Having established this fact, the question next arises, what shall we plant? I will speak here only of the most common varieties, which are within the reach of every one, and which will endure our climate without protection. Foremost among them is the

AUSTRIAN PINE.

This, taking everything into consideration, is, I think, the best evergreen we have. It may not be as handsome, when small, as the Scotch or White Pine, but it becomes handsomer the older it gets, and its regular, symmetrical growth, its bright green color the year around, and its sturdy habit as well as rapid growth and adaptability to any soil, even the poorest and driest, make it exceedingly valuable.

Scotch Pine—This comes next, is even a more rapid grower than the foregoing, but its foliage has a more bluish cast. It will also grow anywhere, but is apt to become more irregular and shaggy than the Austrian when it gets old.

White Pine—This is the handsomest of all pines, when young, and it is not so apt to become shaggy and irregular as the Scotch. It is a beautiful tree, with its bluish white, silky foliage, but not so generally successful as the two foregoing, though sufficiently so to enable everybody to have it. It grows exceedingly rapidly, and attains a large size, being one of the best timber trees of our country. The Pines seem to do better on our prairies and endure our droughts much better than the Spruces, Firs and Arbor Vitæs, very likely because they root deeper than these. Next, and in fact equal to them, is our

Red Cedar, or Virginia Juniper—It will endure the utmost extremes of drought, and is generally found on our most sterile hills. It is a very valuable evergreen, and as it will stand any amount of clipping, can be formed into a very pretty pyramid, and also be used for hedges and windbreaks.

The sexes differ so much in appearance that many take them for different species. The male is of a bluish tint, with finer and more prickly foliage, and never bears any berries; while the female is of a deeper green, more irregular and drooping growth, and produces an abundance of berries. Its only drawback is that it becomes somewhat brown in winter, but the first warm rain in spring brightens it up again. It also roots deeply, and can be grown on any kind of soil and any exposure.

THE SPRUCES AND FIRS.

These comprise perhaps the most handsome of all the evergeen trees, and with a little care and mulching, will succeed everywhere; though they cannot endure as much drought as the pine and cedar, as they root near the surface of the ground and have more fibrous roots. Foremost among them is the Norway Spruce. This is generally considered the best of all evergreens, and if we take into consideration its symmetrical form, fine color and rapid growth when young, and its grand drooping habit when it becomes old, we must concede it has strong claims. It is generally successful, though it should not be planted on arid, southern exposures, and should be always heavily mulched in summer.

White Spruce—This resembles the former very much, though a slower and more compact grower. The foliage is also of a paler green. It is also very desirable. A native of the northern and eastern States.

Black Spruce—This is also a native, and very desirable to contrast with either the Norway or White Spruce. It has a very handsome, regular habit, the foliage is of a darker tint, and is a very compact grower.

Hemlock or Weeping Spruce—This is, in my opinion, the most graceful and handsome of all our evergreens. There can be nothing more graceful than a fine hemlock, its lower branches resting on the ground, and its feathery spray drooping more delicately than a weeping willow. And in spring when the young growth appears, its lively yellowish green contrasts so beautifully with the darker tints of the old foliage that the whole tree resembles a boquet. Besides, it is so bright a green in winter, and bears clipping so well. It makes beautiful hedges and wind breaks; but unfortunately we are almost too far south for it, and it requires a shady situation and heavy mulching to succeed at all.

Douglas Spruce or Double Spruce—This splendid variety is yet comparatively scarce and high priced, but when it is more commonly propagated it deserves a place in every ornamental plantation. It is a native of the Rocky Mountains, and the lover of trees who have once seen it in its native region will not easily forget its deep green foliage; studded over as with stars, with the silvery color of its buds. Those who can afford it ought certainly to give it a place in their plantations, and a thorough trial.

Balsam Firs or American Silver Firs—A beautiful and stately tree, of upright form and rapid growth. The bluish green tint of the foliage and its more loose and open habit, cause it to be preferred to the Norway Spruce by many. It requires, however, little soil to thrive well and grows less rankly than the Norway, and as it does not naturally assume as good a shape, it is not so generally grown. On rich soil and with good cultivation it is a very desirable lawn tree.

The European Silver Firs—I have not found successful here, it is a slow grower and apt to defoliate.

THE JUNIPERS.

I have already alluded to the Red Cedar, (Juniperus Virginiana) as one of our hardiest evergreens. The following are of smaller growth, and therefore especially adapted to smaller dooryards, though pretty anywhere, and all succeed well.

Irish Juniper—Of a very dense and upright growth, making a beautiful pyramid and not growing over eight to ten feet high, and even that size is met with very seldom. It has a very handsome bluish-green color, but on account of its very trim, formal appearance, should be but sparingly employed in large pleasure grounds, though well adapted for lining straight and formal walks, or in front of a city residence, where there is not room for large evergreens.

Swedish Junipers, (Juniperus Sabina.)—This is very branching and trailing, and if properly trained, can be formed into any desirable shape, square, octangular, triangular, etc. It forms a very unique and pleasing object on a lawn, is very hardy and holds its color well in winter.

Trailing Juniper, (Juniperus Rehens.)—This is a beautiful trailing plant of a peculiar, glaucous green color, almost blue, splendid for edging and on terraces, as it does not grow over six inches high, and its trailing branches take root at every joint.

THE THUJAS, OR ARBOR VITÆ.

These are, perhaps, not so much planted as they deserve, because their nature and the treatment they require is not sufficiently well understood, and partly because the winter browns their foliage somewhat. The first warm shower in early spring will, however, brighten them up, and the larger growing varieties make splendid evergreen hedges. They should be frequently clipped to make them grow dense and bushy, and, of course, branched from the ground as all handsome evergreens should be.

American Arbor Vitæ—This is the largest growing variety, and therefore adapted for hedges, for which it is especially valuable. Such a hedge, with the plants set about two feet apart, need not cost more than about $8.00 for every hundred feet, the labor of planting included, as the young plants can be had very cheap, and would, in a few years, make a handsomer, cheaper and more durable enclosure than any other material. They should be clipped several times every summer, broad at the base and pointed at the top, and will thus make a screen so close that scarcely a bird can slip through,

Siberian Arbor Vitæ—This is, perhaps, the most valuable of all the Thujas, as it grows more compact than the foregoing, and is of a brighter green in winter, making a healthful object on a lawn, and also good hedges, though it grows less rapidly and is much more expensive.

American Arbor Vitæ, Round Top—This is perhaps only a sport of the common, but a very valuable one,as it forms a perfectly round bush, and grows into a globular form very dense, compact and pretty. I have seen specimens four feet high, and fully as broad, perfectly round.

Hovey's Golden—A very pretty dwarf variety of the American, with a more compact habit, and a golden tint of foliage.

Compacta—Another very pretty dwarf of a very compact and handsome growth.

Globosa—A very handsome dwarf variety, with a perfect round top, much more dwarfish than the American Round Top, though perhaps not quite so hardy, as it browns in severe winters.

Among the dwarf evergreens I may here name especially worthy of general cultivation, the Mountain Pine, (Pines' Montana,) one of the hardiest and best, of handsome dense growth, not over four to five feet high, bright green color in winter and all the time, very easily transplanted, and succeeds well in any soil. Nor is our common Yucca filamentosa or Adams' Needle as much planted as it deserves. Bright green the year round, it has special attraction of being one of the finest flowering plants, bearing a stem of four to five feet high, with hundreds of white bell shaped flowers.

Nothing can be more appropriate for cemeteries, and it is a beautiful object on any lawn. Besides, it is useful as well as ornamental, as its leaves furnish excellent tieing material, being very tough and pliable. It will succeed on any soil, even the most arid and stony, and is easily increased from offsets.

These are the most common varieties; of course there are many more, especially of fine varieties of the Spruces and Firs, of a more dwarfish habit; but most of these are as yet too high priced for general planting, and those who are able to get them, generally have a professional gardener, who ought to know all about them, perhaps more than I could tell. This essay is written for the information of every one who wishes to add a few evergreens to the atttraction of his homestead, and to give him a few hints about their planting and management. Having pointed out what he should plant, I will try to tell how and when he should plant.

The best time to transplant evergreens in our State, is generally from the beginning of April to the middle of May, according to the season. When the buds begin to swell and develop, then is the time to transplant, be it in April or May, and I would rather transplant later than earlier. Transplanting in fall is almost sure death, as I know from bitter experience.

The best size to transplant—Choose your plants, neither too small nor too large. If you want the best, let them be at least two times transplanted in the nursery, so that they may have an abundance of fine fibrous roots. Choose stocky symmetrical plants, well furnished with branches from the ground, for a badly shaped evergreen is worse than none at all. You want a "thing of beauty," not of deformity. If you possibly can, go to the nursery yourself, make the selection yourself, and see that they are well taken up with as many of their roots as can be had. If you must send to a nursery, send only to one where you know they will be carefully handled. I would rather pay a double price for a first-class plant than take poor ones for a gift. From 18 inches to 3 feet is the best size for all the taller growing kinds.

How to transplant—As soon as the plants are dug, see that they are securely packed in your wagon, or in boxes, with plenty of moist packing material around the roots. The roots should not be exposed to drying winds or frost for even a quarter of an hour while they are moving. If the roots of an evergreen once become dry, they are dead, and will not swell and revive again as the roots of a deciduous tree. Your holes should be prepared beforehand, and be large enough to allow the roots room to spread. In planting, spread the roots evenly and naturally, setting about an inch deeper than they were in the nursery; work the ground, which should be well pulverized, in among the roots with your fingers, so that all is nicely filled up, pressing down lightly with your foot when finished. If the roots have become anyways dry, dip in water before planting, as the fine soil will then adhere to the roots. When all is finished, mulch with litter, straw, dead leaves, or saw-dust, anything to hold moisture. If you have done all this carefully, you need not apprehend any failures; your trees are as sure to grow as apples or peaches. In excessive dry weather during the summer, a thorough watering may be given, say once every week, but if well mulched, they will stand any common drought.

What Distance to Plant.—In ornamental planting we cannot, of course, observe any regularity, and you can plant wherever you think most appropriate. But do not plant too close. Remember always, that the small Austrian or Scotch Pine, Norway Spruce or Balsam, that now occupies but a few feet, will occupy thirty feet in ten years' if well cared for, and that nothing looks more miserable than a tree that has not room to develop. If you wish to occupy the space, and think you have moral courage enough to cut them down, you can plant closer, but do not crowd them out of shape; they will get shaggy and bare as soon as the branches touch.

Of course it is not within the scope of this essay to discourse upon grouping, etc.; this can be found in works on landscape gardening. But I would caution those especially who are planting small gardens or lawns in cities, with but 10 or 15 feet of space between the hall door and the garden gate, against the planting of large and tall-growing evergreens. If they plant such, they will soon have the whole room occupied, and their trees crowded out of shape, so that they will be a source of vexation, instead of pleasure. They should confine themselves to smaller varieties—the Junipers, Mountain Pine, Dwarf Arbor Vitæ, Yucca, etc., which will not obstruct their windows and doors, yet make a pleasant variety in their grounds, and refresh their eyes in winter.

Much might yet be said upon this topic, the comparative value of evergreens and deciduous trees, judicious intermingling of both in planting, etc., but I have already tried your patience enough, and will only add a few words about evergreen wind-breaks and screens, especially on our prairies. I think if every prairie farmer would plant a belt of evergreens on the northern and western sides of his farm, say one tree in every fence corner, or 16 feet apart, he and his animals would soon find a vast difference in winter, and as every nursery generally has a lot of evergreens which are not perfect in shape, but would answer well for this purpose, and could be bought at very low figures by the hundred or thousand, the cost would not be great, and the advantage would be immense compared with the expense. And not only this; it would add variety and beauty to the landscape, and should they ever become crowded, they would make excellent timber and fuel. The varieties best adapted to this purpose would be the Scotch, Austrian and White Pines, which will average three feet of growth in a season, though the Norway Spruce and Red Cedar are also much used for the purpose.

Prof. Swallow: There are two evergreens which Mr. Husmann has not mentioned, but which I think are of great value. One of them is the Douglass Spruce, the finest evergreen in North America, excepting, perhaps, the Hemlock; the other is the Heavy Pine, also a magnificent tree. These trees are both found very plentifully on the western borders of the plains, and the latter especially is often found far out on the prairies. Both trees endure severe cold, and from their native home, being in the arid region of the West, they will easily endure our summer drouths—so destructive to many of our evergreens which have come to us from more torrid climates.

The following essay, by Charles Patterson, of Kirksville, was then read:

TREE DEALERS.

Perhaps very few purchasers of nursery stock from large nurseries, are aware of how nine-tenths of their stock is bought and sold before they receive it, hence, a short explanation may be in order. For illustration, we will say that A B is a long established, permanent and responsible wholesale nurseryman, of wide reputation. His principle customers are dealers, who have grown wealthy in the trade, but are generally unknown to the purchasers. These dealers have a dozen or score of talented agents to canvass, paying liberal and extravagant wages and expenses, including conveyance, generally the best that the local livery stable affords, with perhaps a driver and guide. These agents are assigned territory under the order and vigilant supervision of the dealer. Their business is to make money for their employers by any means that will accomplish the purpose. Moral scruples would hardly be a recommendation to the position. Truth may sometimes be stranger than fiction, in the unnatural care of man, but when his achievements are chained down to a compliance with nature's laws, as are the improvements in horticulture, while fiction is limited only by the ignorance and gullibility of careless customers, a plain unvarnished statement of facts will never become half so fascinating to the average tree-planter, who is easily excited by a desire to excel or at least equal his most enterprising neighbors, and disdains a tedious poring over of books and papers to acquire general information. Hence the dealer finds it profitable to always show and offer something new and extraordinary, and to furnish a large outfit of samples put up in alcohol, by which their size is much exaggerated. These sample cases are kept in stock by extensive business houses for the express accommodation of this class of agents.

The more attractive samples are selected from the stock without regard to usefulness or adaptiveness to our soil and climate. A large number of farmers and villagers have invested and will probably continue to do so, in an endless number of novelties, such as winter grapes at $1.50 each, that will keep like apples; fine apples, of Russian origin, very cheap, at double or treble the price of common kinds, (whether they are the Red Astrachan, Siberian Crab, or something not so good, my informants have not been able to tell me.) Utah Hybrid Cherry, that now proves to be neither cherry nor plum; pears, grafted upon some uncommon stocks that will keep off the blight, sold at $5 a pair; English gooseberries, grape vines, raspberries, covering trellise, growing with joints like grape-vines and leaves ten inches wide, etc., etc., the "soforth" being limited only by the inventive capacity of the vender and the gullibility of the purchaser. The dealer has decided beforehand to buy his stock of A B, therefore his agents are furnished with A B's cards and advertisements, and often take the orders in his name, and use his delivery notices, as if they were dealing directly with the nursery, although A B has no control whatever over the agent, nor is he responsible to the purchaser. If the articles and varieties called for happen to be in good supply, they will probably be put in, otherwise anything that resembles them will be substituted and labelled accordingly.

The only thing that can be said in favor of these agents is that they generally deliver well grown stocks. There is no use scolding or railing at the vender or buyer. While a sufficient number of customers can be found who are willing to pay for being humbugged rather than read books, papers, or your reports, there will always be men found who can humbug them. And those who are seeking to advance general enjoyment by the cultivation of native, health-giving luxuries, are never daunted by obstacles, of which fact the persistent and unselfish efforts of your society is praiseworthy evidence. I regret very much not being permitted to enjoy your personal association, and can only add a wish that you may continue to persevere, in confidence that you will do a good work, although you may not be able to put your fingers on the result.

Recess.

THIRD DAY.

MORNING SESSION.

Called to order by the President at 9:30 A. M.

Prof. Riley, Treasurer during 1877, presented his report for that year.

Prof. Riley donated to the society the amount of balance due him. He also presented to each member of the society a copy of the report of the commission to investigate the Rocky Mountain locust.

Jacob Madinger, of St. Joseph, presented the following report, as Vice-President of the tenth district:

The year 1878 has not been very favorable for fruit in our district. The winter was favorable, but in April and May the weather was wet and cold, and fruit blossoms were very much injured. Apples dropped badly, and what remained on the trees were very inferior. There were scarcely enough for family use. Cherries did a little better. The Early Richmond and some sweet cherries yielded an excellent crop. Peaches were very promising, but dropped badly, and all that remained were rotten and wormy. There were some counties north of us, as Andrew and Holt, where peaches were fine. Pears did better than for many years, bearing a full crop of excellent quality. There was scarcely any blight. Raspberries and blackberries were pretty good. Strawberries did better than for years. The leading varieties are extensively grown here, and they look well. Grapes gave about half a crop, but were of excellent quality. In some localities they were a total failure, on account of the rot. The following varieties were not troubled by the rot: Elvira, Virginia Seedling, Perkins, Ives' Seedling, Goethe and Martha. Forty other varieties might be added, all of which rotted, more or less. Up to date, the prospect for next season is encouraging. Peach buds are thinned out a little, but enough remain for a fair crop. Cherries, pears, apples and grapes are all right. Some of the tender raspberries and Lawton blackberries have been killed by freezing. Our crop of vegetables was quite abundant in early spring. There was a full crop of early potatoes. Late cabbage was scarce.

S. N. Cox, of St. Joseph, presented the following

REPORT ON VEGETABLES.

The importance of the kitchen garden to the farmer, as well as to those who have but a limited space to devote to the cultivation of vegetables, is often underestimated. A few varieties of vegetables, it is true, are cultivated as field crops, and thus receive the needed attention; but beyond this little attention is paid to their cultivation. Care is taken with the garden proper (if care it may be called), in such leisure hours as can be devoted to nothing else. The result obtained is equal to the amount of labor expended. Nor is this all, no effort is made to obtain the best varieties, as any are supposed to be good enough. And so year after year varieties are cultivated that were discarded long ago by more intelligent growers. When we consider how large a portion of our daily food is made up of the products of the garden, the necessity for giving to this branch of industry more attention is apparent. The market gardener realizes the importance of making a good display of his vegetables in the market, in order to insure their sale at remunerative prices, he is, therefore, careful to grow such varieties as look well and give abundant crops.

Quantity and a good appearance are the characteristics which receive the attention of growers much oftener than do the quality of crops. The different varieties of vegetables differ in quality quite as much as in appearance. That there is, however, a growing demand for choice varieties of vegetables is evidenced by the great number of new varieties that are constantly being offered. Many of these have little to recommend them, while each year a few are found to be of value and which, therefore, take a place as established favorites.

The long heat of the past summer seriously affected most vegetable crops. Such as matured before the extreme heat gave abundant crops and found a ready sale at fair prices. Among these were asparagus, early lettuce and radishes, the earlier varieties of peas and the Early Rose potato. Those which required the entire season in which to mature, were very much injured by the heat. The growth was uneven and the quality of the yield very inferior.

To note the different varieties more particularly, it may be said that the cabbage crop, usually a large and important one, was good early in the season and prices were low. As the season advanced, the varieties next in order, such as Tottler's Improved Brunswick, rotted seriously and prices ruled somewhat higher. The later varieties were somewhat better but did not head as evenly as in cooler seasons. The crop of early potatoes was good, but that of late varieties, especially the Peachblow, was nearly a failure, although a few grower had a partial crop. Among the newer varieties of potatoes tried in this vicinity last season were the Alpha, the Victor and the Beauty of Hebron. The first named did poorly, notwithstanding its popularity in the east. The yield of the Victor, a late variety, was good, but its quality cannot be said to be first class. In fact we have as yet found no variety to take the place of the Peachblow, although the variety seems to be "running out." The few persons who planted the Beauty of Hebron were highly pleased with it. It is a very early variety, maturing here from a week to ten days earlier than the Early Rose; yields abundantly, and has very smooth tubers, the quality being all that can be desired.

The season of 1878 seemed particularly adapted to the early varieties of Cauliflower, the extra Early Dwarf Erfurt and the Snowball yielding finely and producing large heads. There seems to be no late variety of this vegetable, which heads well in our climate. Celery did poorly. Besides being injured by the heat of summer, a large part of the crop rotted on account of the unusual warmth in autumn.

The onion crop, although sufficiently abundant to keep prices very low, gave a deficient yield.

Tomatoes were in moderate supply while uneven in appearance, and varieties which, heretofore were considered smooth, and conseqently desirable, seemed to have lost entirely that particular characteristic. There was one exception; the Acme, a new variety, was perfectly smooth and uniform in size and appearance, notwithstanding the unfavorable conditions under which it was grown.

To notice in particular all the vegetable crops usually grown for family use or by professional gardeners, would extend this report much beyond its proper limit. Suffice it to say that the first requisite for the successful cultivation of vegetables, is the selection of the choicest varieties. The crop must receive constant and careful attention while growing. When ready for use they should be gathered with care, and if it is desired to keep them for any length of time, they must be placed where they will not be effected by changes of temperature or by exposure to too much light, and yet where there will be sufficient ventilation to cary off the surplus moisture and prevent decay. In the case of vegetables as well as that of fruit, it is of the utmost importance that when taken to market they should present a good appearance. To send to market inferior vegetables and expect good prices in return is, to say the least, an indication of poor judgment. If those engaged in the cultivation of vegetables desire to make their business profitable, they must see to it that they offer for sale the best varieties, and that they send the same to market in a proper condition. For those who find a pleasure in the garden and its products, there would seem to be in the results obtained, a sufficient inducement to justify the planting of the choicest varieties only, and a careful trial of new ones, in the hope that there might be some among them that would fully repay the grower for the time and labor expended.

Prof. S. M. Tracy, of the Agricultural College, then read an essay on

THE POTATO—ITS CULTIVATION AND VARIETIES.

There are probably as many different theories and practices in regardto the cultivation of the potato, as in regard to the cultivation of any field or garden crop with which we have to do, and among such exceedingly diverse plans as are annually presented in our agricultural papers and advocated by potato-growers in different parts of the country, I shall not attempt to decide, but will base what I shall have to say upon my own successes and failures during several years of careful trial with quite a large number of varieties, which have been cultivated under very diverse conditions.

SOIL.

I have always found the best soil for the potato to be rich, well decomposed sod, on land containing a considerable amount of sand, and which if not well underdrained, would be wet. Such soils may be found in abundance along ravines and river bottoms, where the rich soil from the uplands has been carried by rains, and where the soil is light and full of decomposed vegetable matter. In such locations however, care must be taken that the soil is thoroughly underdrained, either naturally, by a porous sub-soil, or artificially, by ditches or tile. Wet soils will frequently produce enormous crops, but the potatoes are usually coarse-grained, watery and unpalatable. I prefer a clover sod to any other, as the clover roots run to a great depth and bring to the surface a large amount of otherwise unavailable plant food, and they also leave the soil in a lighter and more friable condition than do the roots of the grasses. Old land usually produces light crops, and the potatoes are more liable to disease than when grown on sod. For early potatoes, the soil should be much more sandy than for late varieties.

MANURE.

The potato is a gross feeder, and will thrive upon almost any food, but without an abundant supply of proper nutriment, it is as impossible to raise good potatoes as it is to raise fine fruits. The substances necessary for the growth of the potato, are potash, lime, magnesia, iron, phosphoric acid, sulphuric acid, silica, chlorine, oxygen, hydrogen and nitrogen.

Of these potash, lime, phosphoric acid, sulphuric acid and nitrogen, one or more of them sometimes exist in the soil in such small quantities that the production of a large crop without the use of fertilizers is a chemical impossibility. Lime and sulphuric acid exist in sufficient quantities in many, perhaps I might say most soils, but should either be deficient, the most convenient for of applying it is in the form of land plaster or gypsum, which will furnish both. This will leave us three substances to provide, potash, phosphoric acid and nitrogen. The potato has the natural power of absorbing nitrogen from the atmosphere, and when manures containing large amounts of nitrogen are added to the soil, they frequently induce a very rank growth of vine, but the tubers are apt to be small, watery and very liable to disease. When the soil is already rich in vegetable matter, no nitrogenous manures need be applied, but where there is but a small amount of vegetable matter in the soil, stable manure may be profitably used.

Potash and phosphoric acid are the substances which are most frequently wanting in the soil, and an ample supply of these may be obtained by the application of from twenty to fifty bushels of unleached or five times as many leached ashes per acre. Of course the kind, amount, and condition of the manure applied will vary greatly with the condition of the soil, and the comparative cheapness with which the different manures can be obtained.

In heavy clay soils, undecomposed stable manure is very valuable, both for its mechanical action in making the soil lighter, and its chemical effects in furnishing the plant food in which such soils are usually deficient.

For light and sandy soils, well rotted manure should be used, but where the soil is rich and light as it should be, stable manure is of comparatively little value, and wood ashes only need be applied. Nearly every one who raises potatoes for his own use only has an abundance of wood ashes for manuring them thoroughly; I doubt if the ashes can be used as profitably on any other crop, and they are very beneficial on all soils. It makes but little difference how the manure is applied, whether put in the hills only or scattered broadcast, as when the potatoes are planted at proper distances the roots will cover and absorb their food from the whole surface of the ground.

PLANTING.

As much care is necessary in preparing the ground for potatoes as for any other crop.

The ground should be plowed as deeply as possible in the fall, and if subsoiled so much the better. In the spring add wood ashes, and manure if necessary; plow lightly and then harrow until the ground is fine and mellow.

We often read of large crops of potatoes being raised from parings or from sprouts, and many successful potato-growers contend that a half or even the whole of a large tuber is none too much for a single hill. My experience indicates that either plan may be carried to an excess.

The seed that will produce the strongest plant is the best. When parings or very small pieces are used, great care is necessary in planting, and should the season prove unfavorable, many will fail to grow. When whole tubers are used, a great number of plants are produced, which will crowd each other so that none of them have room to develop fully, and a large amount of seed is wasted. When seed is very scarce, the tubers may be cut into very small pieces, a single eye making from eight to twelve sets. By dividing the eyes to their fullest extent from ten to twelve pounds of seed is ample for an acre, but with such very small sets great care is necessary in preparing the ground and in planting. Taking into account the cost of seed and labor of planting, I have succeeded best by planting one eye with a large piece, or two eyes with smaller pieces of the potato attached. As the young plant draws its first nutriment entirely from the seed, a large piece of potato will produce a stronger *young* plant than will a small piece, and so a thriftier growth early in the season is secured by giving the young plant a liberal supply of prepared food.

The seed should be cut a day or two before planting, in order that the cut surface may have time to dry over, and so be less liable to rot, should excessive rains follow planting.

If the cut pieces are rolled in land plaster or ashes, it will assist in preventing decay and add vigor to the young plants.

For marking the rows, a single plow is best. On light soils, the seed should be covered about four inches deep; on heavier soils, two or three inches are sufficient.

The rows need not be more than three feet apart, excepting in the case of some unusually strong growing varieties, the hills from two to three feet apart in the rows, according to the growth of the variety.

Some two or three years ago a machine was invented, and has been extensively sold, which is worked by horse power, and cuts and plants potatoes at one operation. By the use of this machine, a man and horse can plant from five to six acres per day, but it has one great objection, which is, that it always cuts pieces of the same size, regardless of the number or position of the eyes.

CULTIVATION AND HARVESTING.

The cultivation of the potato should be thorough and constant, from the time when the vines appear above the ground until they are in blossom, after which nothing need be done. In plowing, the dirt should be thrown toward the hills, so as to raise them slightly, as the tubers are formed on the upper part of the underground stem. For digging, a spading fork is far preferable to a hoe, as the work can be done much more rapidly, and with far less danger of cutting the potatoes.

The best place for storing potatoes is a cool, dry and perfectly dark cellar. It is better to pack them in barrels, but where large crops are raised, of course, this can not be done. If they are to be kept in large bins, a pound of lime dusted over each barrel as they are put in, is very beneficial in preventing rot.

Potatoes kept in mounds out of doors should be well dried before being buried, and should receive thorough ventilation through the holes in the top of the covering until extreme cold weather sets in.

VARIETIES.

In taking up the subject of varieties, I feel that I am treading on delicate ground, for it is a matter in which very few will agree, for potatoes vary as much as fruits in different localities. The best early potato I ever saw was the Early Goodrich, raised on yellow quicksand soil, where almost the entire amount of nutriment taken up by the plants had to be furnished in the form of manure. For two years I have tried to raise it on fine clover sod land, and have failed to get tubers over an inch in diameter.

For the best late potato, we probably have nothing to equal the old Peachblow. It ripens late, but when it does ripen, it is not equalled by any other for table use, and will keep in good condition until late in the summer. It withstands the attacks of insects better than almost any other variety, which is an important desideratum. In our hot climate it should be planted very late, so that by the time it is fairly ready to grow, the intense heat of summer will be gone, and as it continues to grow until the vines are killed by frost, usually until into November, it has time to develop good sized tubers. Last year I planted a quarter of an acre of Peachblows on July 10th, and on October 24th dug twenty-four bushels, or at the rate of ninety-six bushels per acre.

Beauty of Hebron, introduced by the Department of Agriculture, last year, is a very smooth white potato, of excellent table quality. It is shaped like the Early Rose, and ripens at about the same time, but appears to be a much better keeper.

Snowflake has proved unusually good with me. It is of fine quality, yields well and keeps well.

Brownell's Beauty has been a failure when planted on heavy clay lands, but on well drained river bottoms it will give an enormous yield of excellent potatoes.

White Neshannock is among the best for fall and early winter use, but is very uncertain, as sometimes nearly every tuber will rot in the ground.

Early Rose heads the list for summer and fall use, but when grown in our warm climate, it becomes watery and of inferior flavor early in the winter.

PRODUCTION OF NEW VARIETIES.

There is probably no vegetable in which so many new varieties have been introduced, taken into public favor, and then generally discarded, during the past twelve years, as in the potato. A part of this may be from a deterioration of varieties, but it is largely owing to the production of new varieties which are in reality superior to those before in use. Prior to the introduction of the Early Rose in 1868, almost no efforts had been made to produce improved varieties; since then we have had the Peerless, Bresee's Prolific Climax, Late Rose, Early Vermont, Brownell's Beauty, Snowflake, Alpha, Ruby, and other well known sorts. Very nearly all of our improved varieties have been produced by two men, Bresee, to whom we owe the Early Rose, Peerless, and others, and Pringle, who has given us Snowflake, Alpha, Ruby and others. Both of these men live in Vermont.

The future plant receives its character while the seed is forming. If we wish for varieties which will endure the warm climate of Missouri, is it not more reasonable to look for them from seed grown in this climate than from that grown in the much colder climate of Vermont. New varieties are obtained by fertilizing the flower of one variety with pollen from some other desirable sort, and then planting the seed. The first year the yield is unusually small, only a few ounces from a hill, though sometimes several pounds are obtained. These potatoes give very little indication of the future product of the plant, as a single seed will often give tubers of different shapes and colors. The tubers raised the first year are planted the next spring, and the tubers produced the second season are usually larger, and often entirely different from those grown the first year. In the third year the seedling potatoes usually assume their permanent character, but even then the chance of having a variety superior to the parents is no greater than in fruits, so that time and labor are required for the production of anything valuable.

I believe that the coming potato for Missouri must be of southern if not of Missouri origin, and until we have a potato with such an origin, I do not think we can hope for one that will fill the requirements of good table quality, good yield and good keeping quality.

We have no trouble in obtaing good early potatoes, but we have no late variety on which we can depend.

The Agricultural College is now testing about seventy-five varieties of seedlings, some of which are of great promise.

Seed has been sowed from a number of our best varieties, and we hope that we may sometime give to the public a potato which shall be for the South what the Early Rose and Peachblow are for the North.

Mr. C. W. Murtfeldt then read the following essay:

ARE POTATOES POISONOUS?

There is no vegetable which enters so generally into the daily consumption of the people of this country, as the so-called Irish potato. No dinner is complete without potatoes, either boiled, mashed or without mashing. Saratoga potatoes are a luxury for breakfast, and a nicely cleaned and baked potato, when done to a turn, is a feast for an epicure. I confess that I like potatoes in some shape at every full meal. But before going further, I hear some one ask: "What are Saratoga potatoes?" I answer, potatoes nicely pared and cut in slices and fried in fat, just as doughnuts, or crullers are fried. And in passing, allow me to say that you need not be afraid of the fat, they will soak but a small percentage, not more than you would wish to supply were you to use butter.

Pardon me, reader, I did not set out to write an essay on culinary art, but to write about a vegetable which is universally esteemed and, perhaps, to say something of the cultivation required to bring it to perfection.

It will not be necessary to refer to its habitat, nor to its introduction into Europe and this country, but I will state that it belongs to a family of poisonous plants, solaneceæ, or night shade. And this fact has provoked this article for your consideration. A recent writer in a periodical claims that from the potato skins a deadly poison may be prepared, and that it is a question of health to take large meals of potatoes principally; and furthermore, potatoes ought to always be pared before cooking, and the skins of baked potatoes are unwholesome food. Now, without having tried to produce a poison from potato skins and, therefore, not knowing, I will grant for the sake of argument that the poison exists; but I contend that it must be in such infinitessimal quantity that no harm can come to any one from eating one or two baked potatoes with the skins, if preferred. Prussic acid is contained in the peachpits, and yet we add a few to every can of peaches and partake of them without harm. No one, even the most delicate person, will receive damage from a kernel or two; yea, and doctors also use this same prussic acid (much diluted of course), with benefit to their patients!

And now, as to paring potatoes before cooking them, I claim that it is a perfect waste and a positive damage to the palatability (whew! what a long word) of the tuber; it wastes the very best part. Let me prove this to you, my reader: John or Will just go down cellar and bring up two or three medium-sized potatoes, wipe them clean, and now take a sharp knife and divide them or one of them into equal halves; now, rub the two sections together, look at them and you will discover next to the skin a ring more or less broad, according to the quality of the tuber. In the best quality this ring will be nearly half an inch broad, and in the poorest, only the width of a narrow straw. Nearest the heart or center, the potato will be watery. If you have different sorts take one or more of a kind and it will not take long to determine which is the best potato. And now it is very evident that in paring, all the better portion is wasted, or at best given to the pigs or other stock. Most of the starch or sugar stuff contained in a tuber is contained within the circle shown. Again, were potatoes so unwholesome as the writer claims, how is he to account for the superior physical condition of the poorer Irish or the Germans, whose daily-diet consists of potatoes mostly partaken of very often with only a little salt, without meat and without bread?

Some years ago when potatoes rotted so badly in "the Old Country," as well as on this side of the Atlantic, did not famine stare in the face of the poor? All kinds of experiments were tried to stay the disease.

I remember a little article contributed to the Illinois Agricultural Report, showing how the people of Kansas (just then in trouble) could plant their potatoes and eat them also, viz.: pare them thick, or cut out the eyes and plant these and save the rest of the tuber for the table. Of course, there is no necessity for this proceeding unless potatoes are scarce. I am sorry that I cannot give in exact figures the value of the average annual crops of the United States. Horace Greeley estimated it at many millions of dollars saved to the country by the discovery of Paris green as a remedy for the Colorado potato beetle. The State of New York voted to the widow of the late Dr. Goodrich a bonus of five thousand dollars for the laborious experiments and gratifying results of the doctor, to improve this valuable esculent. But of the many varieties produced by Dr. Goodrich, only a very few proved desirable, and are at present cultivated. But the field is wide and still open, and I am glad to notice that even the Agricultural College of Missouri is trying experiments with the "Murphies," with very indifferent success thus far.

THE BEST SOIL

In which to grow potatoes is a rich sandy loam, such as is found in the northern portion of Illinois, in Michigan, Iowa and Minnesota, and other Western States. Wherever practicable, I would give level culture, and all cultivation and hoeing should be done before the vines are in full bloom. New land, even to the Southern border of our State, will produce palatable tubers. As good "Peachblows" as ever graced the table of any man, are found on mine this winter, and grown in this neighborhood, too. Some of the newer sorts, such as the "Snowflake," "Brownell's Beauty," and others, are giving great satisfaction in the States just named, but I believe did not do well at Columbia. The immediate application of barnyard manure is not advocated; a clover sod will produce a good crop; wood ashes are a valuable fertilizer, and a coating of lime where it does not naturally exist in the soil is of great benefit. Actual experiments bear me out in the assertion that the change of seed from North to South, and *vice versa*, is advantageous and will repay every time. At the present prices paid in St. Louis, a good crop of potatoes is better than a very good crop of wheat. I was glad to obtain my winter supply at 60 cents per bushel.

Prof. Tracy: It is true that the potato belongs to a family of plants that are poisonous. The tomato belongs to the same class. But the process of cooking dispels the poison. Tomatoes when green are quite poisonous.

Mr. Husmann: I agree with what was said about paring potatoes. It not only holds good with the potato that the best part is nearest the skin, but with fruit also. I am so well satisfied of the fact that I seldom pare an apple or peach; when the fruit is sound I can hardly bring myself to do it at all.

Prof. Tracy: As to changing seed I will remark that I bought a bushel of seed potatoes (Early Rose) from the North, paying $1.50 per bushel. I bought some raised near Columbia, and planted them side by side, and when I came to dig them there was no perceptible difference. I furnished a boarding house with them and took first from the lot raised from Northern seed, and then from the other, and the consumers never made any remarks as to difference in quality. I well know, however, that one such experiment does not prove anything.

Prof. Riley: I fully agree with what was said in the first essay: that if we want good varieties we must originate them here, and we must originate them repeatedly, and the seed which we plant should certainly be grown in our own climate.

Mr. Ragan: The people of Missouri do not half appreciate what is being done at the Agricultural College. Some of the work and the tests that are being made there are invaluable, and the College should be liberally supported. We need more of such work, and at the College is the proper place to have it done. What has been said in reference to the production of new and improved fruits will apply equally well to potatoes; the work is long and tedious, and often discouraging.

Mr. Hussman offered the following resolution, which was adopted:

Resolved, That the thanks of this Society are due and are here-tendered to Prof. Riley, for the donation of a number of the reports of the U. S. Commission on the Rocky Mountain locust, and that we take pleasure in again acknowledging the deep indebtedness of the horticulturists and agriculturists of our State for his untiring efforts in their behalf.

Prof. Tracy offered the following, which was also adopted:

'WHEREAS, The State of Missouri has for nine years employed a State Entomologist, whose duty it has been to make observations upon the character and habits of our injurious insects, and to suggest proper remedies and preventives for the same; and

WHEREAS, The State is now in possession of nine annual reports of the Entomologist, which contain a vast amount of matter invaluable to the horticulturists and farmer, but in such a shape as to be unavailable to a large majority of those interested; therefore

Resolved, That the State Legislature be solicited to provide for a revision and condensation of these reports, and their publication in such a form as will make them available and convenient for general use.

Mr. Murtfeldt offered the following, which was adopted:

WHEREAS, Hon. Judge Krekel, in the absence of the United States Marshal, C. C. Allen, tendered to the society the use of the United States court-room in which to hold its meetings,

Resolved, That the hearty thanks of this society are due, and are hereby tendered to his honor, Judge Krekel, and to United States Marshal Allen for their kind consideration; and that we also tender our thanks to the hotels of this city for favors extended, and to the janitor for his attention and uniform courtesy.

The Secretary read the following communication from Jas. A. Storm, of St. Joseph, on

COLLECTING AND EXHIBITING OUR PRODUCTS.

Mr. President and Gentlemen of the Missouri State Horticultural Society:

I wish to call your attention to an important matter, and that is with regard to collecting and exhibiting the products of our State. Now, who will take upon himself the task or go to the trouble and expense of getting up such a collection for our State? The benefit that would be derived from such a collection, if properly gotten up and properly displayed at some of our great fairs, is, in my judgment, immense. In order to make such a collection, a vast amount of labor and some expense would be required. For the sake of economy, I would recommend the State Horticultural Society as the most suitable body to undertake this task. No doubt you will all think that the society has enough to do under existing circumstances. I fully agree with you, that as the few members who have remained steadfast have been working hard to keep the society in existence, to add new labors without means, would be suicidal.

I feel confident that if this matter were put in proper shape and properly presented to the Legislature, they would not hesitate to make a suitable appropriation to defray all necessary expenses attending the getting up and working of such display. I should like to know if when it pays the Atchison, Topeka & Santa Fe Railroad to make such displays as they do, it would not pay Missouri also? Will it not pay Missouri to make similar or better displays, which she can do with less expense, provided she can get the co-operation of the State Horticultural Society and other societies to aid her. These displays are a mode of advertising, which is far superior to printers ink and costs much less, as you can, in one minute, present more to view than you can describe in a month in print. I would call your attention to the display that Kansas made at the Centennial. Did it pay? I will venture to say that there is not one of you but will agree with me that the exhibition of her products was worth millions to Kansas. If it will pay Kansas to advertise, why will it not pay Missouri? She feels the necessity of making known the many advantages which she possesses. Thousands have passed over her soil on their way to the oases of Kansas, whither they have been drawn by just such advertising. If such an appropriation as I have designated should be asked, I have no doubt that some of our legislators will object, as they cannot see the importance of such displays. They have never given the subject any thought, consequently, as true representatives, they may vote against it. But I do think there will be enough of the enlightened ones to carry the appropriation. We do not ask the appropriation as individuals, but as a State. It is for the State at large, and we will return the principal with a larger per cent. than she has ever made.

Mr. President, as our society is in need of a stimulus, I think the plan suggested would serve as a good one, for in its behalf we will be able to show to the Legislature the necessity of such appropriations. I noticed in the *Rural World* of Dec. 25th, a report from Hon. Geo. Husmann, of the number of varieties of vegetables and cereals that were grown on the Agricultural Farm at Columbia. Would it not be very interesting as well as beneficial to the public to have a collection of fruits, vegetables and cereals, grown on the experimental farm, exhibited in connection with the general display. The public then could see the benefit of such an institution, and would be more willing to aid such a commendable enterprise.

My reason for suggesting the State Horticultural Society as being the most suitable, is that it is a State institution, is at the head of all local societies, and can bring to bear a larger influence than can any other organization. It would therefore have much influence on our Legislature, and the State would be better represented. If we could have the means at our command, I would advocate the erection of a permanent building, say in St. Louis, where our cereals and minerals, also specimens of our fruits and vegetables could be seen at all seasons of the year by those who are seeking homes. Such a collection would be interesting to our citizens as well as to strangers.

If such could be accomplished, we could show at a glance the rich products of our State, and it would be a lasting advertisement and an instructive and pleasing sight.

I present these views to you for your consideration. If you approve them I would recommend immediate action, as we have lost many golden opportunities of presenting to the public the many advantages which our State possesses.

Mr. Evans offered the following resolutions, which were adopted:

Resolved, That a committee be appointed, whose duty it shall be to prepare and exhibit at the next meeting of the American Pomological Society, a collection of fruits grown in Missouri.

Resolved, That a Committee on legislation be appointed, who shall present to the State Legislature the needs of the Society, and urge a sufficient appropriation to meet the expenses of this exhibition, and to pay other necessary expenses of the Society.

Messrs. J. C. Evans, Geo. Hussmann, Z. S. Ragan, S. M. Tracy, Wm. Stark, G. C. Thelenius, H. C. Wilson, A. W. St. John, of Carthage, F. F. Fine and H. T. Mudd, were appointed a committee to prepare the exhibit for the Pomological Society, and the President of the Society made an ex-officio member of the committee.

Messrs. Krekel, Mudd and Minor were appointed a committee on legislation.

Prof. Riley read the following

ENTOMOLOGICAL NOTES.

The Grape Phylloxera—The fact that about 280 tons of California grapes were received weekly and sold in the markets of Philadelphia during the past season, is sufficient to show that the grape interest in this country is increasing in importance, and to lead to the hope that the discouragement which the Missouri grape-grower must feel after four consecutive unfavorable seasons, must needs soon give way before brighter prospects, that it seems to me, are necessarily in store for him. One thing is sure, namely, that the interest manifested abroad in our American grape vines does not flag. These vines are constantly discussed in the foreign horticultural journals, while one periodical, entitled *La Vigne Americaine*, (the American vine), is entirely devoted to them. It is a source of no little satisfaction to me, that the varieties which I first recommended, seven years ago, are, in the main, those still most sought for and used by the French sufferers from Phylloxera, as stock on which to graft their viniferas. It is further interesting to observe that the grounds which I took in regard to grafting above ground, in my seventh report, pp. 108, 116, are justified by the experience had during the last few years in France. Such grafting is found to be quite practicable, notwithstanding the want of faith shown in it by our earlier ampelographers. I sincerely

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hope that this question of grafting the vine above ground as a means of evading the injuries of Phylloxera, or of improving such varieties as do not succeed upon their own roots, will be discussed by your society, so as to bring out whatever experience on the subject the Missouri grape growers have had of late. The fears which I expressed in my seventh report, as to the danger of the introduction and spread of the Phylloxera in California, have also been more than justified; since many vineyards have already been seriously injured or totally destroyed by the insect. I am glad to be able to confirm, in this connection, the truth of the statement of Mr. P. J. Berckmans, of Augusta, Georgia, namely, that this insect does not occur in that locality. While spending a few days with him last September, I was able to verify its non occurrence there; and here let me remark that, however much contempt a Missourian may have for the Scuppernong, no one can witness the prolificacy or experience the delicacy and sweetness of such varieties as Tender Pulp and Thomas, as they grow in that region, without having a due appreciation of their value for the Southern States.

Regarding the range of Phylloxera, it had often been asserted that around Washington, the root insect was not to be found, yet I have found it extremely abundant, both in the vineyards of the District and of those just across the line in Virginia; some of the latter suffering to such an extent that the crop was a failure, though the owners were unsuspicious of the cause.

After reviewing, in my 8th Report, all that was then known of the habits and natural history of the Grape Phylloxera, I drew certain practical conclusions to the effect that complete knowledge of its habits, instead of simplifying its destruction, showed that it was almost, if not quite, hopeless to expect its destruction by any possible or practicable means,and rendered preventive measures all the more urgent. I expressed my doubt as to the value of decortication of the vines, and the burning of the bark in winter, or any means which aimed at the killing of the winter egg upon the branches and canes of the vines. Diligent search had failed to reveal these winter eggs in anything like the quantity one might expect, and the fact remained that the insect could go on propagating under ground for at least four years without the necessary intervention of the impregnated egg. Further researches made since, confirm me in the belief that the normal mode of hibernation of the species is as a young larva upon the roots. From the results of the deliberations of the International Phylloxera Congress held last summer at Lausanne, France, it was conclusively proved that decortication, as I had anticipated, was of little or no avail.

Before leaving this question of Phylloxera, let me briefly refer to certain theories first propounded by Prof. A. J. Cook, and that have been extensively promulgated during the past two years, as to the relation of phylloxera and grape-rot. I took occasion last spring to protest, in the New York *Tribune*, against the supposed connection between the two, and it will not be out of place to repeat the reasons:

"Already in 1871, when I first announced the presence of phylloxera on the roots of American vines, and explained the injury which it caused, there were writers who, not content with the simple facts, went much further and asserted that this little insect must also be the cause of mildew, rot, etc. Professor Cook has jumped to similar false conclusions, and has, during the present winter, promulgated before various societies his belief that the phylloxera is the cause of black rot in grapes. This is sensation, not science, and is to be deplored, coming from the source it does. The phylloxera occurs in most grape-growing sections of the country east of the Rocky mountains, and will quite naturally be found on vines on which the fruit has rotted.

"But an experience covering several years, and the examination of hundreds of vines—with rot of fruit and without it, enables me to deny the assertion that the insect is more numerous on the former than on the latter. The phylloxera disease has its own peculiar characteristics, which are at once distinguished from other vine diseases by those understanding it. There are also very conclusive reasons for discarding the views of Professor Cook: 1—In France, where the phylloxera has been so very destructive, the black rot has not accompanied or followed it. 2—The rot, so far as I have observed it, is no worse on the susceptible than on the more resistant varieties; while many cases might be adduced of healthy vines, and those least affected with the insect, suffering most from rot. 3—On account of the three successive wet summers of 1875, 1876 and 1877, in this part of the country (Missouri), the phylloxera has been less numerous and less injurious than at any time since 1871, and many vines that were suffering near to death have recuperated. Yet no year since the time mentioned has black rot been worse than it was last summer.

THE WESTWARD PROGRESS OF THE IMPORTED CABBAGE-WORM.

In 1869, in my second report, in treating of this insect, I remarked: "There is every reason to fear that it may some day get a foothold in our midst, after showing that it was then confined to certain restricted parts of Canada and New England, and had not spread west of New

York. It has been making further progress westward every season since. The past year it has done considerable damage as far west as Chicago, and I have also received good testimony that it was observed around St. Louis. I have given my reasons, in the report referred to, for believing that it will prove much more disastrous to the cabbage fields around St. Louis than the southern cabbage worm, (*Pieiris protodice*,) which has always been with us and has done, at times, considerable damage; and I refer those who wish to be prepared with a full knowledge of the habits of this species, to that same report.

As remedies, few liquids will prove more effectual than hot water, judiciously applied, though one pound of whale oil soap, dissolved in six gallons of water, or even a strong tar water may be used to advantage. The application should be made several times during the year, as it will be most effectual when the worms are young.

As preventative measures, the worms may be induced to transform under flat pieces of board laid upon any objects that will raise them about an inch from the surface of the ground. These boards should be examined every week, and the transforming larvas or the chrysalids destroyed. The butterflies may also be captured by hand nets, and thus prevented from laying their eggs.

Geo. Husmann, of Sedalia, presented the following report on

GRAPES.

The Concord, which is the chief variety planted here in many places, set imperfectly and rotted considerably. The fruit was not so fine as generally, but the crop may be estimated at about one-third, which sold, if well handled, at about four to five cents per pound.

Ives rotted but little, and produced a very fair crop, but, on account of its poor quality, sells very slowly in this market.

The Delaware is rather a poor grower, and is apt to drop its leaves, but seems to do better than at Hermann.

Goethe and Wilder.—These two varieties seem to be at home on our prairies, and produced a very fair crop, which sold readily at ten cents per pound, much more so than the Concord at four cents. They seem to be very healthy in growth, fruit and foliage, and will be my main dependence in the future, as the people buy them for their fine size and appearance, and when they eat them they cannot help buying again.

Martha has generally done well here, and although set rather imperfect, also rotted less than the Concord. It will not sell as well as the two last, however, on account of its rather small greenish berries which many consider not ripe when offered for sale.

Rogers 39.—A few small vines bore some very fine fruit, free from rot, as early as the Hartford, and five times better in quality. I am inclined to think it very valuable as an early market grape.

Triumph.—This was very fine indeed, a small cane hardly two feet in length producing five pounds of exquisite, transparent, golden yellow grapes, and I have great hopes for it as a fine late white grape for market.

Elvira did not set well, and the leaves were attacked by a kind of rust. It does not seem suited to our location, but may improve on longer acquaintance and when the vines get older.

Norton's Virginia proved the "old reliable," and has a very full crop of fine fruit.

APPLES.

About the only apples which did well here were the Maiden Blush, Lowell and Rambo, and these only in certain localities. They are certainly as reliable as any, and sold readily at one dollar per bushel.

PEARS.

There was a very poor crop of pears, but what we had were very fine, and the trees were remarkably free from blight. I am inclined to think this region well adapted to pears, also quinces, of which I have seen fine crops for two years now, as soon as the trees became old enough to bear.

Mr. Murtfeldt then offered the following, which was adopted:

Resolved, That the thanks of the Missouri State Horticultural Society are hereby tendered and its appreciation expressed to Prof. S. M. Tracy for the instructive exhibit which he has made of cereals experimented with at the Agricultural College, and for his efforts to advance the horticultural interests of the State.

Mr. Evans offered a resolution, thanking Hon. W. G. LeDuc, Commissioner of Agriculture, for reports of his department, which had been sent to each member of the society.

Mr. Hussmann, chairman of the committee on wines, made the following report:

We find only one sample on the table, from Mr. Jacob Rommel of Morrisson, Missouri, made from a seedling of the wild grape (Æstivalis) found in the woods. A very heavy wine, of deep straw color, unlike any other sample ever before tasted by us, with a sherry flavor, and considered very promising.

Mr. Rommel gave a history of the grape from which the wine was made, saying that it was a seedling from the wild Æstivalis found in the woods, and that from his experience with it so far, he believed it would become one of our leading varieties for wine. He also spoke of his experience with other new varieties, and stated that it required several years for a grape to develop itself from the seed. Some varieties which at first bore only a few inferior berries, afterwards became of great value. This was the case with the Elvira and other well-known sorts.

Mr. Hussmann offered the following, which was adopted:

Resolved, That the thanks of this society are due, and are hereby tendered to Mr. Jacob Rommell, for his untiring and successful efforts in growing new varieties of grapes from seed, and which have given to the wine growers of the country such varieties as the Elvira, Amber, Pearl, Beauty, Transparent, and many others of high promise. The committee on fruits, Messrs. Ragan, Hussmann and Tracy presented the following report:

We find on the table three collections of fruit, one from J. C. Evans, of Harlem, including Ben Davis, White Winter Pearmain, Gilpin, Pa. Red Streak, Baldwin, Stark, Smith's Cider, Janet, Winesap, Huntsman's Favorite and Lawver; one from G. Weber, of Tipton, including Wagner, Gilpin and an unknown, but very fine looking and finely flavored sweet variety; and one from Z. S. Ragan, of Independence, including Janet, Missouri Pippin, Huntsman's Favorite, Stannard and Smith's Cider apples, and Vicar of Winkfield pears.

Invitations to hold the next meeting of the society at St. Joseph and other points were received, and after some discussion it was decided that the next meeting should be held in St. Louis.

The society then adjourned.

S. M. TRACY,
Secretary.

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ERRATA.

The name of T. T. Turner, of St. Louis county, author of the Essay on Jersey Cattle, was inadvertently omitted.

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